Telephony.

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Independent Telephone Men

By R. G. Shelden

THIS is the age of the young man in business. The theory that a man should be well along in years or have streaks of gray in his hair to be a success has been exploded long ago. In this connection it is interesting to note that the leaders in Independent telephony — operators, manufacturers and publishers—are all young men, due no doubt, to the fact that the movement is little less than a decade old.

James S. Brailey, Jr.

James S. Brailey, Jr., whose portrait graces this page, is the president and controlling factor in a dozen telephone companies, serving upwards of 100,000 subscribers. His interests are scattered throughout a number of states and run up into the millions, yet Mr. Brailey is only 35 years of age. He was born at Wauseon, Ohio, in 1872, was educated for the law at the Ohio State University, and practiced for a few months at his home town. When the Independent movement started Mr. Brailey and E. L. Barber built the telephone plant at Wauseon. In this work they had associated with them H. T. Bingham and A. R. Conklin. This was one of the very early Independent systems, and has always been prosperous. After building several small exchanges near Wauseon, Messrs. Barber and Brailey took up telephone construction work as a business, forming a partnership under the firm name of Barber & Brailey, which partnership was continued for a period of eight or nine years, during which time the firm built over fifty different telephone properties, all of which were successful. Among the largest of these telephone systems were those of Toledo, Ohio; Kansas City, Missouri; Louisville and Lexington, Kentucky; Utica, New York; Richmond and Goshen, Indiana; and Elyria, Piqua, Urbana, Delaware and Bucyrus, Ohio. After the active field for building Independent systems of greater size had narrowed down the partnership was dissolved and the properties owned by the firm were divided, Mr. Brailey taking the firm's interests in the Toledo Home Telephone Company, of Toledo, Ohio, and Mr. Barber taking certain other interests in the operating properties.

Since the time of this division Mr. Brailey has confined his telephone interests to Ohio and Indiana. He is president of the Toledo Home Telephone Company with 13,000 telephones, the Cuyahoga Telephone Company of Cleveland with 26,000 telephones and the Indianapolis Telephone Company with 13,000 telephones. He is also president of the United States Telephone Company of Ohio, and of the New Long Distance Telephone Company of Indiana. The systems which the United States Telephone Company owns embrace 16,000 telephones and the systems owned by the New Long Distance Telephone Company comprise 5,000 telephones. Mr. Brailey controls the systems at Sandusky, New Philadelphia and Perrysburg, with installations of over 6,000 telephones.

Aside from his holdings in operating companies Mr. Brailey is president of the American Automatic Telephone Company, of Urbana, Ohio, and holds a considerable amount of the company's stock. He is a director in the company, as well as a director in the Urbana (Ohio) Home Telephone Company.

Mr. Brailey makes his home in Toledo, Ohio, is widely known in telephone circles and takes an active interest in district, state and national association work. His interesting and successful career proves the statement made in the opening paragraph of this sketch, that this is the age of the young man in business.

We wish him many years of active successful life, and trust that the future holds for him all manner of good things.

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Editorial Department

RE-ELECT THEODORE GARY.

PROBABLY every member of the International Independent Telephone Association will agree with TELEPHONY on the proposition that Theodore Gary should be re-elected president of the organization at the coming Chicago convention. Mr. Gary was elected only last June, so his first term is of necessity a short one. During the last six months, however, President Gary has demonstrated that he is the man for the place, and wisdom demands that he be retained to carry out the work he has so well begun.

Since his election at the 1907 convention Mr. Gary has taken hold of association work with a vigor and intelligence that have already counted for much in the development of the organization's influence. It would manifestly be short sighted to permit him to retire practically at the outset of his administration.

Whether at headquarters or at his home in Macon, Missouri, President Gary has worked hard and to good purpose to advance the cause of Independent telephony. He is now in a position to render still more efficient service, and TELEPHONY thinks it not improper, even at this time, to congratulate both him and the association on his re-election as president and wish them both a prosperous year in 1908.

FOOD FOR THOUGHT.

HERE is a thought for Independent telephone men who may be tempted to buy apparatus from the Western Electric Company to ponder over:

The American Telephone and Telegraph Company—the parent Bell concern—is trying to buy all of the Western Electric stock, and to that end has offered the stockholders $250 in four per cent convertible bonds of the A. T. & T. Company, or $225 per $100 share in cash for their Western Electric holdings. The Bell now controls more than half of the Western Electric stock, but, octopus-like, wants it all.

In view of this fact—which is openly admitted in a circular sent out by President Barton of the Western Electric Company—is it wise for Independent operating companies to buy Western Electric goods?

The answer is *"No,"* of course.

The Bell wants the Western Electric to get Independent business for the obvious reason that it would enable the Bell to get a half-Nelson grip on such Independent companies. The Western Electric wants Independent business because it needs it. This is shown by the following dispatch from Boston, where the control of the Western Electric Company is held:

"While the fiscal year of the Western Electric ended November 30 will show a decrease in gross sales of approximately $19,000,000, or 27 per cent from the previous twelve months, there are strong evidences in the general telephone situation which warrant the belief that the company has passed through its period of depression. The opening of the fiscal year found the American Telephone subsidiaries generally over-stocked with telephone apparatus and the large bulk of unfilled orders on the books of the Western Electric, which were worked off during the first half of the last fiscal year, tended to augment the total of over $10,000,000 telephone supplies, which the associate companies were carrying practically in storage. As a result of the sharp curtailment in orders for telephone apparatus, the gross sales of the Western Electric, which were between one and two per cent greater for the first seven months of 1907 than for the same period of 1906, were but little more than half as large during the last five months of 1907 as during the same five months last year."

Independents should avoid playing into the hands of the Bell. Instead, they should adhere to the following resolution adopted by five of the district conventions representing the Ohio Independent Telephone Association.

"Whereas, The Western Electric Company, a subsidiary company of the American Telephone and Telegraph (Bell) Company, has persistently and unceasingly persecuted and harassed the Independent telephone interests of the country for the past twelve years by suits for alleged infringements of patents and by intimidating intending investors and subscribers by threats to bring suits; and

"Whereas, These suits have been successfully defended largely at the expense of and by the skill and energy of the Independent manufacturers of telephone apparatus, who have in the meantime produced and perfected apparatus far superior to that made by the said Western Electric Company; and

"Whereas, The said Western Electric Company, at the dictation of the A. T. & T. Company now offers to sell its wares outright to the Independent companies at cut prices with the object (if we may believe the press reports) of getting a footing with said companies, so as to ultimately assist the A. T. & T. Company in disrupting the spirit of co-operation that exists between said companies through their state associations and International association, and with the object of equipping such Independent companies as may buy from them with Bell apparatus so that they may eventually be connected with the Bell system, and that this move is only a stepping stone with that end in view;

"Therefore, Be It Resolved, that the members of this District of the Ohio Independent Telephone Association are requested not to purchase, nor use, nor to connect with any company that uses (Bell) telephones, switchboards, or equipment made by the Western Electric Company, and

"Be It Further Resolved, that the secretary of this district be instructed to send a copy of this resolution to the secretary of the International association and each of the state associations and to all of the trade papers."

BY WAY OF GREETING.

READERS of TELEPHONY will notice a number of changes in this the opening issue of the new year. Some alterations in the general appearance of the publication have been made, possibly making it less familiar in some ways, but also, the publishers hope, adding to its attractiveness and value as an exponent of the Independent telephone movement. Some experts in the publishing business contend that no changes in a journal should ever be made; so that the old friend which reaches the subscriber's hands once a month will always look the same. But, after all, is that according to nature? All things change in this world as time goes on. Some grow old and ugly at the same time. Others have the faculty of growing old grace-

fully. As time goes on TELEPHONY hopes to improve still more with age, and to look better with each succeeding year. Its patrons deserve the best it can offer, and they will get it.

It was with this thought in mind that the publishers planned the improvements to be noted in this issue of TELEPHONY. Some of them are the results of suggestions made by readers who replied to our invitation to send in their views on "How to make a more valuable paper." All of them, needless to say, are intended to please our circle of readers and give the telephone industry a better journalistic advocate.

And, having made this modest bow, TELEPHONY wishes all its friends a Happy New Year.

ASSOCIATION STAMPS.

THE International Independent Telephone Association has issued stamps to be attached to apparatus for use in the Independent field, and a number of manufacturers are affixing these stamps to all telephones and switchboards shipped. It is planned eventually to have these stamps used by every one selling apparatus, supplies or material to Indepent operators for the twofold reason of raising funds to carry on association work, and to guard the operating companies against Bell apparatus.

This plan was not launched any too early, for word has come from New York that all Bell subsidiary companies must buy all equipment and supplies large and small from the Western Electric Company, which is owned by the American (Bell) Telephone and Telegraph Company. This latest order from the parent Bell concern means that it wants all the telephone business of the sublicensee Bell companies. In other words, no Bell company is permitted to buy any but Bell apparatus and supplies.

With the lines so closely drawn it is incumbent on Independents to buy nothing but Independent telephones and supplies from those concerns who affix association stamps to their product. In this way every manufacturer and dealer who is entitled to them can secure stamps from the International Association, and his goods will be approved as Independent products.

As this publication wishes to further Independent interests in every way possible it will affix stamps to all advertising invoices leaving this office and urges that all those who sell to Independent telephone interests use stamps also. If the Bell companies can buy only Bell apparatus and supplies, then our duty as Independents is plain.

A FINANCIAL SAFEGUARD.

MANY persons and circumstances have been given credit for warding off a financial panic during the recent flurry in the money centers of the country. Some have said that J. Pierpont Morgan stepped into the breach and stemmed the tide that at one time threatened to engulf the New York money structure. Others have praised Secretary of the Treasury Cortelyou for hurling the government's cash into the whirlpool to calm the storm, while others attributed the lull to the policy of the big banks in standing by smaller institutions in distress.

But now the telephone is given credit for saving the situation. The Minneapolis Tribune prints an editorial which shows that the instantaneous service afforded by the long-distance telephone, as compared with the delays incident to the telegraph played a vitally important part in restoring confidence, securing co-operation among financial centers and quelling the disturbance in banking circles. The editorial says:

"The more the history of what was done in the recent stress comes out, the more plain does it appear that the situation was saved by the long-distance telephone. The public took the extraordinary action of the banks calmly because it was simultaneous and universal, and all the banks took the same action at the same time because every one of them had been consulted and agreed upon it beforehand. Only a few years ago this would have been impossible.

"Consider what happened and in what a brief space of time. At a meeting of New York bankers late on a Saturday night, it was decided that they could no longer ship currency balances to their western correspondents. Chicago and St. Louis bankers, these being the central reserve cities, learned of the action at once. By Sunday afternoon they had agreed upon their course and had notified other reserve cities that currency could not be shipped to them. Before evening the latter had resolved upon their course and their depositors were notified that certified checks would be substituted for money in paying most drafts. This was done, not in a few cities, but in all.

"The most marvelous fact remains. All the small country banks with deposits in reserve banks and all their considerable depositors, including still smaller state and private banks in remoter regions, were advised of the situation Sunday night and had agreed upon a common course of action. In twenty-four hours the business and financial interests of 80,000,000 of people, separated by thousands of miles, had met in conference like a board of directors and agreed what to do. No such amazing example of quick action by organization ever was seen.

"It would have been impossible without the long-distance telephone. That reached beyond telegraph stations and it brought the influence of the personal voice and the opportunity to answer questions and discuss before agreement that would have caused fatal delay with the telegraph."

All of which furnishes another striking proof of the wonderful utility of the telephone.

"A SACRED PART OF THE HOME."

A NEW YORK court has fixed the status of the telephone in its relation to the home. One of the tenants in an apartment building broke his lease and left his flat, giving as his excuse the fact that the janitor and his wife made it a practice to "listen in" when tenants used the telephone. The landlord brought suit to collect rent for the unexpired term of the lease. On hearing the defense, the court (Justice Lynn) decided in favor of the tenant, in an opinion in which were included these words:

"A telephone is not a toy or instrument to be played upon. It has passed the period of experiment and now is a real, living part of ourselves. It expresses the soul and mind of our feelings; the heart-throbs of the human voice are felt as keenly over this instrument as when one person talks to another, and when it is installed as part of an apartment house then its presence must be regarded as a sacred part of the home."

This judicial declaration plainly shows what a vital part the telephone has come to play in advanced civilization.

THE FARMERS' PROCLAMATION.

THERE is an unmistakable ring to the resolution adopted recently by the National Grange on the telephone question. It shows an adequate appreciation of the value of the telephone, recognizes the benefits of competition and likewise condemns any attempt to continue a monopoly of so necessary an invention as the telephone. The fact that the resolution mentions no particular corporation does not detract from the significance of the proclamation—for it is no less, coming from so strong an organization representing hundreds of thousands of farmers, the bone and sinew of the American nation.

The resolution follows:

"The National Grange, having in the past opposed monopolies of any and every kind and a telephone monopoly in particular, your committee desires to call your attention to, and it is with pleasure we note the immense increase in

the number of telephones in use among the farming communities and especially where competition is most active.

"We find the service is better, rates are lower and the number of telephones is greater under competition than under monopoly and therefore recommend the passage of the following resolution:

"Whereas, The telephone has become a public convenience and necessity, which should be installed in the home of every farmer, we wish to go on record as favoring telephone competition as the only means whereby we can receive the best telephone service at the lowest rates.

"We condemn any law that fosters a monopoly in the telephone business as against the best interest of the members of the Grange and the people generally, and call upon the members of the different organized bodies, members of the legislatures in the different states, members of the house of representatives and senate in congress convened, and the president of the United States, to use their best endeavors to allow free competition and permit the people of this nation to buy telephone service when and where they please.

"We condemn any law or method whereby the people must pay tribute to a monopoly for a necessity of life and are opposed to the United States government making exclusive contracts with any telephone company, and call upon each and every member of the Grange of the different states to use their best efforts to see that laws are enacted and men elected to public office that will give us active competition in the telephone business."

The Independent telephone movement and competition could ask for no better indorsement than the above proclamation from the farmers of the United States.

CONCERNING COPPER PRICES.

HERE is a ray of sunshine for the telephone man who has had cause to bewail the abnormally high prices of copper. Former Senator W. A. Clark, the Montana copper magnate, predicts a return to sixteen-cent copper, and he is given credit for knowing whereof he speaks. Mr. Clark said: "The total reduction in the output of copper is so large that six months ought to see the surplus eliminated entirely. When that is done, I expect to see copper go back to about sixteen cents a pound, which, while it will not permit all the mines to resume on the old basis, will furnish employment for a large proportion of the men thrown out of employment by the recent slump."

Lower copper should greatly facilitate an increase in telephone development during the new year.

AN INTERESTING SERIAL.

WE ARE sure our readers will follow with close attention the "Telephone Reminiscences" of C. E. McCluer, which begin in this issue. A pioneer in both the telegraphic and telephonic art, Mr. McCluer is splendidly equipped with facts and experience to give us some valuable historical data on the telephone and its achievements. Born in Indianapolis in 1836, his first business experience was as messenger in the New York office of the Pioneer Telegraph Company of the United States, the "Magnetic." He studied telegraphy and took service with the New York and Erie Railway Company, at Piermont, New York, in 1852, and remained with that company at various points as operator and station master until 1855, when he resigned and returned to Virginia.

From 1858 till 1880 he officiated as operator and station agent at central depot on the Virginia and Tennessee Railway; as auditor of transportation accounts and telegraph superintendent for the Virginia Central Railway at Richmond; as superintendent of supplies for the Confederate Telegraph Company at Richmond during the war; and as operator at Knoxville and telegraph manager at Lynchburg. From 1880 to 1898 he held the position of district superintendent of the Southern Bell Telegraph and Telephone Company at Richmond.

Shortly after resigning from the Southern Bell Mr. McCluer was offered the management of the Richmond Home Telephone Company, which he filled until 1903, when he retired from active work, and has since lived at Norfolk, Virginia.

His reminiscences will be one of the features of TELEPHONY during the coming year.

HANDLING CORRESPONDENCE.

"WHO can say how many dollars spent in advertising have been counted as lost, where the failure of the scheme or soliciting force back of it to develop inquiries and interest into real, profitable business, was the basic fault? Indeed there are many, many cases on record where good correspondence and letters freighted with the utmost selling force have propped an otherwise badly planned and conducted advertising campaign—actually made it show a profit, when by all standards, and judged by itself, the advertising was lacking in the essentials that have been proven necessary to the fullest measure of success.

"Soliciting business through the medium of letters is like fishing a trout stream. The inexperienced and unknowing will get many bites and perhaps a few fish, while he who knows how, even though he goes behind, gets everything in the stream that can be got—one rarely gets away from him. It is useless to fish such a stream, for several days after the real sportsman has been over it. So it is when a master in correspondence handles the inquiries and orders produced by advertising—he gets all, the utmost that can be developed into profit."

The above excerpts from an article by M. M. Graves in the American Business Man contains so much that is vital to the concern going after business by mail, that it is published with the hope that it will be of value. Advertising is a science, but not so much a science as following up inquiries and turning them into orders. This requires a thorough knowledge of all the word salesmanship implies.

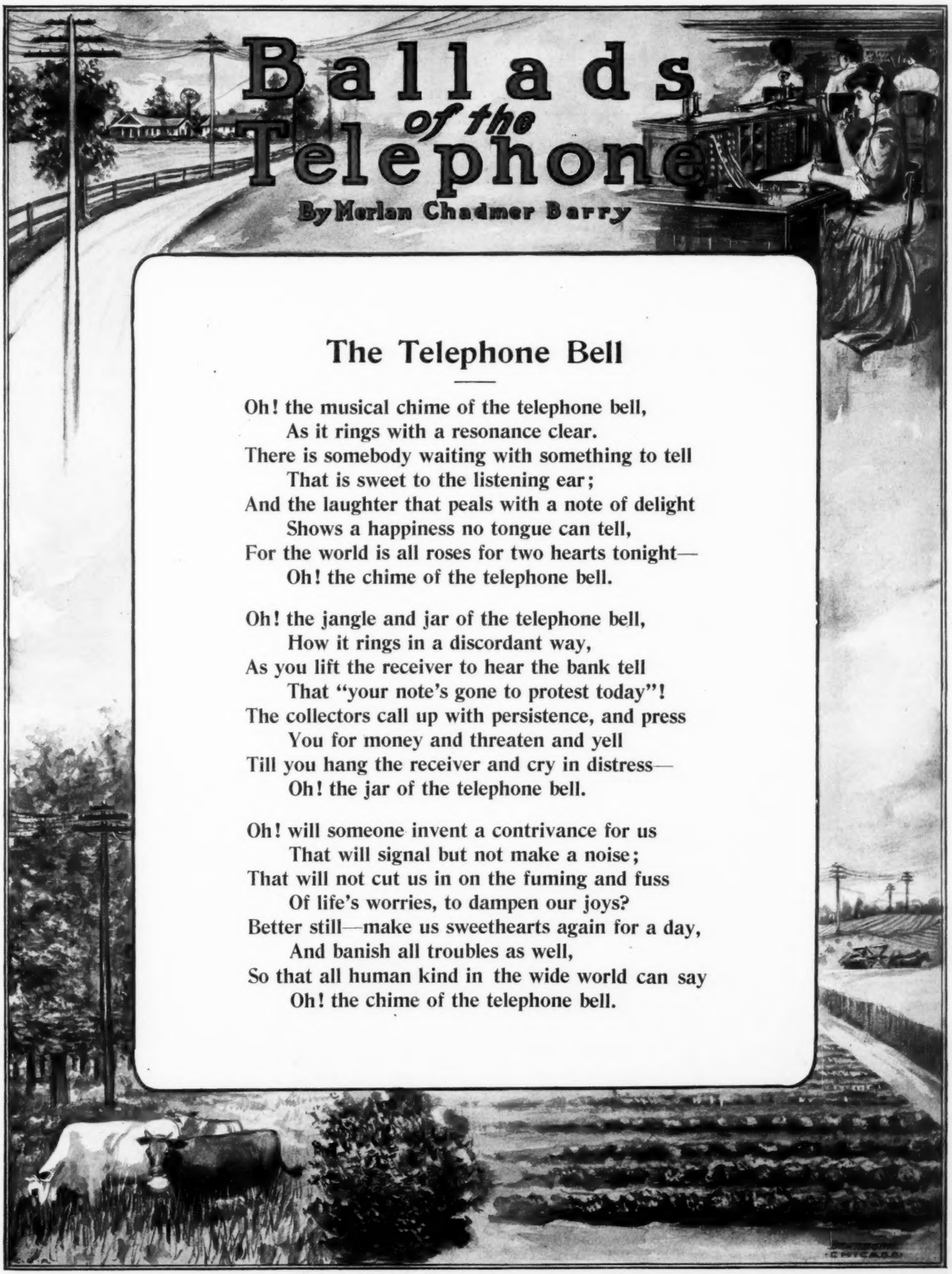
WRINGING THE BELL.

THESE invigorating, crisp autumn days are not very happy days for the Bell combine. If he pays any attention to current events in the telephone field, Mr. Fish, who handed the presidency of the octopus over to Mr. Vail several months ago, must smile contentedly to think himself out of the turmoil, and inwardly remark: "I wish him well."

Down East, in Boston, the grand jury has voted to indict the New England Bell for padding its payrolls with men who did no work but who had a political pull. In New York there is much cursing and raving at the execrable service the Gothamites say they are overcharged for. In the Southwest all sorts of trouble is being made for the Bell sub-licensee, which in that territory is known as the South-Western Telephone & Telegraph Company. In the southern states, where the Cumberland Bell operates, there is a steady stream of complaint, particularly from municipal officers who seem to have ground for their assertion that the Cumberland takes pride in defying the city and state authorities.

The telephone octopus is certainly getting plenty of notice, but it is equally certain that such notoriety is not profitable. Where there is so much smoke there is some fire, and the fire is extremely likely to damage the tentacles of the aforesaid octopus.

A MAN who has made a study of business success says: "The whole commercial structure of the world is built up by advertising, ninety-nine per cent of which is done by type." It is the persistent forceful salesman, that neither sleeps nor rests and which brings to the man who uses it intelligently, his full measure of reward.



Ballads of the Telephone

By Merlan Chadmer Barry

The Telephone Bell

Oh! the musical chime of the telephone bell,
As it rings with a resonance clear.
There is somebody waiting with something to tell
That is sweet to the listening ear;
And the laughter that peals with a note of delight
Shows a happiness no tongue can tell,
For the world is all roses for two hearts tonight—
Oh! the chime of the telephone bell.

Oh! the jangle and jar of the telephone bell,
How it rings in a discordant way,
As you lift the receiver to hear the bank tell
That "your note's gone to protest today"!
The collectors call up with persistence, and press
You for money and threaten and yell
Till you hang the receiver and cry in distress—
Oh! the jar of the telephone bell.

Oh! will someone invent a contrivance for us
That will signal but not make a noise;
That will not cut us in on the fuming and fuss
Of life's worries, to dampen our joys?
Better still—make us sweethearts again for a day,
And banish all troubles as well,
So that all human kind in the wide world can say
Oh! the chime of the telephone bell.

THE NATION'S PROSPERITY

From All Sections Comes word that All is Well With Independent Telephony

THE COUNTRY'S INVENTORY

Hay, 1907, $660,000,000	**Export domestic merchandise, annually, $1,853,718,000**	**National assets, $1,500,000,000,000**
Corn, 1907, $1,350,000,000	**Mineral production, annually, $3,000,000,000**	**Poultry and eggs, 1907, $600,000,000**
Farm wealth, $7,412,000,000	**Manufacturing products, annually, $14,802,147,000**	**Money in circulation, $3,250,000,000**
Wheat crop, 1907, $500,000,000	**Seven cereal crops, 1907, $2,378,000,000**	**Live stock, total value, $4,875,000,000**
Cotton crop, 1907, $675,000,000	**Money in Federal Treasury, $345,245,600**	**Lumber production, 1907, $550,000,000**

From the above it will be seen that our fundamental prosperity is unquestioned. In the presence of these figures, showing us to be the wealthiest nation in the world, comment is unnecessary.

IN order to place before its readers the views of the leading men in the field on the Independent telephone prospects for 1908, TELEPHONY addressed a letter to prominent operators and manufacturers inviting them to commit their forecasts to paper. The replies are given herewith, and show to a gratifying degree, the confidence reposed in the Independent industry by the men closest to that industry, as well as an abiding faith in the soundness of American prosperity as a whole. The letter sent out by TELEPHONY was as follows:

We are of the opinion that 1908 will be the greatest year the Independent telephone industry has known. The recent financial flurry is passing without much harm having been done, and the prosperous condition of the American people seems only to have been interrupted. Secretary Wilson's statement which places the year's farm products at $7,412,000,000 is an unassailable prosperity argument.

We will appreciate an opinion from you as to the telephone outlook for the next year and will use your reply in a symposium we are preparing for the January issue of TELEPHONY. *We trust you will favor us with a prompt response, as we wish to have these letters represent the views of all the prominent telephone men from all parts of the country.*

In response to the above letter the following letters were received:

FROM MISSOURI.

REFERRING to your request to give my opinion of the outlook for the Independent telephone business for the year 1908.

Theodore Gary.

I have no doubt the telephone business will be better in 1908 than it was in 1907, for the very good reason that the Independent telephone business has been better every year I have known anything of it (which covers a period of about ten years), and that the present depression is in no way affecting the stability, earning power and collections of the telephone business. This opinion is based on an actual experience with more than a dozen plants, and upon inquiring from many managers and others interested in the telephone business.

Some one has said that water has been running down hill for as long as man knows anything about time. Judging from the past it will *continue* to do so. The telephone business will continue to get better until there is a development of at least five times the number of telephones in use to the present population than at this time. Judging from the past the business will be better in 1908 than in 1907, and better in 1909 than in 1908. *Theodore Gary, President of the International Independent Telephone Association.*

FROM OHIO.

OUTLOOK for telephone development for the year 1908 is good. With the enormous crops of 1907 marketed and the January 1st, 1908, interest payments made, a large amount of money will be returned into the hands of the farmers and the general investors. A substantial amount of this will find its way into the treasuries of the various Independent telephone companies, because a large number of investors see the importance of purchasing securities in home industries, and the large number of Independent telephone companies to-day have been financed on local capital. This new money will enable them to take care of part at least of their waiting business.—*James B. Hoge, Cleveland, Ohio, Ex-President of the International Independent Telephone Association.*

James B. Hoge.

FROM ILLINOIS.

ANSWERING your esteemed favor of the 3rd inst., would say that the present financial flurry has had little to do with the Independent telephone business and but slight effect upon the volume of trade. Some temporary embarrassment may have been experienced in certain quarters in meeting obligations owing to the action of the banking interests in curtailing the line of discounts and refusing to supply their depositors with currency.

J. G. Ihmsen.

This may truly be called a "bankers' panic," as nearly all who are engaged in the telephone business have abundant resources and in most cases plenty of money if they could only get it. The large volume of new work that we are now making estimates upon warrants the conclusion that if only one-half of it is carried

through there will be an unusual demand for equipment in the early part of 1908. We are of the belief that a very much larger percentage of the work contemplated will be completed as the lesson taught by the recent heavy decline in speculative securities will make a serious impression upon the investors and prompt them to cultivate the more substantial and much safer securities that are being offered by Independent telephone companies. The "get rich quick" fever that has pervaded the community, attracting investment funds to Wall street and the large money centers is rapidly subsiding and the time that will be permitted between now and next spring for those afflicted to figure up their losses in railroad stock and trust stocks should result in correcting the judgment of the investors and direct their attention to the securities of enterprises that are conducted under a safe and sane policy.

The Independent telephone industry throughout the entire country is more especially to be benefited than most anything else, because of the growing necessity of telephone service both in business and in the household, also on account of the wide field offered for activity in this line, and further because of the fair promotion and honest management of the institutions.

The small investor should be especially impressed with this class of collateral on account of its regular payment of fair returns upon the investment, the unchanging value of the security and the fact that the companies are sufficiently localized to enable him to learn something of the property, become acquainted with its officials and gain information as to its successful operation and progress.

While the present financial stringency may have had a dire effect upon certain classes of speculative holdings, I firmly believe that it will be of permanent benefit to the Independent telephone business and also look for a clearing of the atmosphere more rapidly than has heretofore been experienced on account of the splendid fundamental condition of the country, and feel that there will be a much larger demand for telephone equipment in 1908 than there has been in the past year.—*J. G. Ihmsen, President of the Telephone Manufacturers Association.*

FROM WISCONSIN.

YOURS of the 3rd inst., relative to the telephone situation in 1908 received. In reply, I have to say that in my opinion, the financial conditions are already improved and will be very materially improved shortly after the first of the year. I believe that money will be more plentiful and easier to obtain for legitimate local investments in 1908, than it has been at any time in the past several years. I base this opinion on two principal reasons:

H. D. Critchfield.

First: The general contraction of business which will probably prevail until after the next presidential election, will require a smaller volume of money to handle it.

Second: The confidence of the people in the soundness of the underlying conditions of the country is largely restored, and in my opinion, will be entirely so within a month or two, and money will be seeking investment.

The state and federal regulation of the charges of public service corporations and issuance of securities, is here to stay, and in my opinion, the next year or two will see that proposition firmly and generally established throughout the entire country. This will mean that public service corporations which have issued bonds in many instances largely in excess of the actual cost of their property, and in addition to that, have issued as much or more stock, which stock has been selling, in many instances, at more than twice its par value, based on earnings, will be so regulated in their rates, that their charges for service will not enable them to pay the dividends upon which these high prices of securities have been based. These conditions have been more prevalent among the larger corporations, and in my judgment, there will be more timidity in the minds of investors with reference to railroad and other large issues of securities, by companies controlled at points remote from the average investor, than will exist with reference to local corporations with which the general public in any given community, are in close touch.

These conditions, in my opinion, will largely reduce the investment in certain classes of securities, and naturally will inure to the benefit of the more conservatively financed and managed local concerns, of which the Independent telephone properties furnish a marked example. For this reason, together with the prosperous condition of the general public, that part of the public particularly amongst which the telephone development of recent years has been most marked, will not only continue the demand for telephone service among those classes, but will make it easier to procure the money with which to furnish it.—*H. D. Critchfield, President Milwaukee (Wisconsin) Independent Telephone Company.*

FROM INDIANA.

THE outlook for telephone business in 1908 is, in my opinion, much better than our national foolishness and ignorance would seem to justify. This is because modern life demands the telephone and it is more economical to have it than to do without it. In some places the building of new plants and extensions will, of course, be postponed on account of the condition of money and stock markets; but on the whole, I do not apprehend that sales will be less than heretofore, for the very reason that anyone who desires to be on an equality with his fellows in meeting hard times must of necessity have a telephone. Until every business house and every home, therefore, has as many telephones as can be used to advantage, nothing can stop the onward march of this industry.

G. A. Briggs.

At the same time we should not, because we are thus happily situated, overlook the fact that a depression exists in the business world and is causing much anxiety and loss in many other lines, especially where there is much indebtedness.

Depressions of this kind seem to be legitimate fruit of our industrial system and I do not believe their evil effects can be escaped by talking hopefully. Something more than conversation is needed, for faith without works avails nothing. I do believe, on the other hand, that every financial depression of the last one hundred years is traceable to one cause and that cause is Special Privilege. In many forms it constantly presents itself and always as a menace to legitimate industry. This is true because it is a natural law that, taking humanity as a whole, it is impossible to secure something for nothing. If the laws of our country, therefore, permit some to get without giving, it necessarily follows that others must give without getting. And, when this process continues for a number of years, the legally protected parasites, through Special Privilege, absorb so much wealth without returning an equivalent that there is not enough left for the demands of legitimate industry. Business men then borrow money and hope for better

things until their credit reaches the limit when any disturbing event will destroy confidence and a panic is on.

If as a nation we should adopt the policy of abolishing Special Privilege and thus recognize the folly of trying to get something for nothing, panics would soon cease to be characteristic phenomena of our civilization.—*G. A. Briggs, President Chicago Telephone Supply Company, Elkhart, Ind.*

NO UNDERLYING CAUSE FOR PANIC.

YOUR letter of December 3rd requests our opinion as to the telephone outlook for the coming year.

The financial situation during the past year has demanded liquidation in all lines of business as well as in securities and the stock market. There appears to us to be no underlying causes for a prolonged panic or period of depression such as have existed as causes for previous panics. When liquidation is complete confidence will be restored and business will resume on a normal basis.

J. C. Belden.

It cannot be denied that liquidation—that is, curtailment of output and expense and reduction of stocks of raw and finished material carried—in the electrical business has been in progress for six months. It is our impression that electrical and telephone industries began this process of liquidation before other lines of business felt the necessity of it, and therefore will complete this process first and will be among the first to resume business on a normal basis.

We believe the process of liquidation in the telephone business is practically over, and that the first of January, 1908, will see a resumption of business on a normal scale at least.—*Joseph C. Belden, President Belden Manufacturing Company, Chicago.*

FROM DISTRICT OF COLUMBIA.

IN response to yours of the 3rd, asking my opinion on the outlook for 1908, I find it difficult to properly express the facts in a few words. I believe the year 1908 will not only be the greatest year that the Independent telephone industry has ever known, but will be the greatest year in every respect that our country has ever seen. The recent financial flurry has acted like vaccination that "took," and will undoubtedly prevent further similar trouble for a long time to come. People here who are in touch with the Government agents all over the country are reporting the most unprecedented prosperity and business development. The atmosphere of Washington is charged with conservatism, and corporations in general will be helped and not hindered by any legislation that may be had this winter.

E. E. Clement.

Technically there is no doubt that in the telephone field we are entering a new era. The recent intense activity of designers and engineers will culminate in the presentation of many improvements to the public. Without going into detail, it may safely be said that the manufacturer, operator and investor, especially the last named, have unequalled opportunities before them for making reputation and profits. Instead of making any attempt to hoard their money, people should hasten to invest it, of course, taking the usual precaution of satisfying themselves as to the soundness of the companies they go into. This is the only question that need be raised, however, as the telephone business is growing and will continue to grow enormously and every dollar invested helps every other dollar.

During 1908 there will come many chances to reduce operating expenses, and in due course of time this will enable the companies to reduce rates generally. We are moving rapidly toward the time when every new building will be wired for telephone service as surely as it is piped or wired for gas or electric bells or lights, and when that time comes the companies will probably be able to pay excellent dividends with a two or three cent message rate to their patrons. Of course this means handling as much business as possible by machinery, which in every industry is the secret of cheap and reliable production. This, however, is already within our power.—*Edward E. Clement, Attorney and Counsellor at Law, Washington, D. C.*

FROM NEW YORK.

THE history of the telephone business indicates that it prospers during periods of depression almost as much, if not more, than it does during periods of general prosperity. This is due to the well-known fact that when economy in business-getting is put into effect, one of the first items that is cut down is traveling. Instead the business man telephones. It is conceivable, therefore, that the present depression will not affect the receipts of telephone operating companies. Expansion is no doubt being curtailed owing to the money condition, but this situation, to my mind, will right itself early during the coming year.

Paul Latzke.

As soon as the crops have been marketed, and the funds returned to the farmers, money will get into circulation very rapidly, and the ordinary business chain will resume its moving.

With an increase of over seven billions of dollars in the agricultural worth of the country over 1906, there is no cause for apprehending any prolonged business famine even though a presidential election is impending.—*Paul Latzke, Editor Telephone Securities Weekly, New York City.*

A PROSPEROUS YEAR.

THE year 1908 will be more prosperous for Independent telephone companies than any which have preceded it. The demand for telephone service is and probably always will be greatly in excess of the supply. Financial, political or other flurries cannot stop the growth of this great industry; more and more people must be supplied with telephone service every year.

W. H. Crumb.

The Independent companies, being almost exclusively local organizations, are at a great advantage in supplying telephone service, as they are in close touch with the requirements and know best how to furnish them.

The present problem seems to be the securing of sufficient funds for additional investment necessary to keep up with this vast growth. Confidence in Independent securities as profitable investments is growing rapidly, and the general prosperity of

the agricultural sections, from which these investments have largely come, will but add to the prosperity of the whole industry.

Independent telephone people may look forward to a happy and prosperous New Year.—*W. H. Crumb, President W. H. Crumb & Company, Chicago.*

SHOULD BE BEST YEAR.

REPLYING to your letter of the 3rd inst., relative to the telephone outlook for the coming year, I see no reason why it should not be the greatest year in the Independent telephone industry. While at the present time there is very little sale for Independent telephone securities, owing to the recent financial flurry, I think that after matters quiet down people will realize that telephone securities are the safest and best investment they can get, and a great deal of money will be put into telephone securities as well as telephone improvements and extensions throughout the country the coming year.

E. L. Barber.

Hoping this prediction may come true, and with the compliments of the season.—*E. L. Barber, President Central Home Telephone Company, Louisville, Kentucky.*

FROM MONTANA.

IN response to your request for an expression of opinion as to the outlook for Independent telephone development for the year 1908, I am of the opinion that the ensuing year will witness an unprecedented growth of Independent telephone properties.

Thaddeus S. Lane.

Although financial conditions during the past few months have forced all Independent telephone interests to either curtail or abandon proposed extension, this has been more than offset by the fact that the vitality and real worth of Independent telephone securities have been brought prominently to the attention of the investor and to the public generally. It is safe to say that no live industry has suffered as little from the present financial depression as has the Independent telephone business. The fact that it is an ideal "hard times" business has been clearly demonstrated; and, with the resumption of normal conditions, a vast amount of capital, which has heretofore been engaged in purely speculative fields, will be diverted to Independent telephone securities, which have so clearly demonstrated their ability to maintain large earnings throughout a critical financial period.

Telephone companies should, at the present time, be arranging their financial plans, locating material, and taking all of the preliminary steps for the opening of a big campaign in 1908. It should be remembered that, although there is an apparent shortage of currency at the present moment, and credits are very much restricted, the majority of the banks throughout the United States have an immense reserve fund on hand, which, as a precautionary measure, will be retained until confidence in the general business situation is restored. To a less degree, but for the same reason, the individual investor is hoarding currency. At no late date, a large amount of this money will be open for investment, and there is no reason why Independent telephone securities, which have demonstrated their worth under present conditions, should not attract a large investment with the return of normal business conditions.—*Thaddeus S. Lane, Managing Director Montana Independent Telephone Company, Butte, Montana.*

BUSINESS WILL IMPROVE.

REPLYING to yours of December 3rd, regarding business conditions for 1908, we are of the opinion that business during 1908 will not be so good as it was during the early months of 1907, but there is no question in our minds that it will improve vastly over what it is to-day.

F. G. Jones.

We believe that the telephone business will improve in greater proportion than almost any other kind of business, because the telephone is more of a necessity than almost all other articles of commerce. We would not recommend to a manufacturer that he expect a record breaking business during 1908, however. We think that conditions will greatly improve. Business will not be quite so good as it was early in 1907.—*Frank G. Jones, President American Electric Fuse Company, Muskegon, Michigan.*

FROM IOWA.

IN reply to your inquiry of December 3rd, would say that in one way I regard the recent financial flurry as a benefit to business interests in general and Independent telephone enterprises in particular. We were all working at high pressure and apparently unmindful that a wave of depression might strike us at any moment. The result of the stringency in the money market will cause us to keep close to the shore and not borrow so heavily to make improvements and extensions. I do not mean that they should not be made, but that we should go slower in making them. There is enough depreciation in the telephone business at the best, and it behooves us to make our equipment last as long as it can be made to give efficient service. In our anxiety to give a better service than our competitor we have in the past, I fear, discarded instruments and other apparatus that could have been made to do duty for some time and have installed the newest and best on the market irrespective of cost—and in consequence many plants are carried at comparatively high valuations.

George N. Bandy.

For the year 1908 I expect the Independents to greatly improve their long distance service and that many consolidations of companies operating long distance lines will be made, which will greatly improve the condition of all Independent plants, as it will enable them to furnish their patrons with long distance service better than they are now receiving over the lines of our common competitor.

I look forward with pleasure to the developments of the near future when all telephone patrons will appreciate this sentence: "It is better to use the Independent lines than to wish you had."

Wishing you a Merry Christmas, a Happy New Year, and that the year 1908 will be a record breaker for

TELEPHONY, I remain.—*George N. Bandy, President Hawkeye Telephone Company, Des Moines, Iowa.*

FROM PENNSYLVANIA.

YOUR letter of December 3rd at hand and noted. It is rather early to predict the telephone outlook for the year 1908, especially as we are not yet through the financial depression.

C. E. Wilson.

Our fiscal year ended on June 30th and our net earnings for the four months ended October 31st, 1907, show an increase of $27,000 over the same period of the previous year, as against an increase of $8,000 in 1906 over the same period of 1905.

I may say that generally speaking, the outlook is good and barring any unforseen developments in the early part of 1908, we shall have a prosperous year and wish the same success to all of our friends in the Independent field.—*C. E. Wilson, General Manager Keystone Telephone Company, Philadelphia, Pennsylvania.*

NO HARD TIMES.

NO hard times talk for us or from us. The weeks of financial flurry through which the country has passed, brought to The Vote-Berger Company no diminishing of business. On the contrary, we have more unfilled orders on our books right now than at any previous time in the history of the company. We have been running full force up to a few days ago, when we commenced to move our factory to our large new plant in the south part of the city.

M. I. Berger.

We do not feel that we can afford to shut down even during moving and as fast as we have a machine installed in the new factory, we send over a workman to operate it. Our new plant will, by spring, more than double our present capacity. New buildings will be erected immediately after the close of winter. November and December orders so far have more than doubled business of same months a year ago.

This is in reply to your letter of December 3rd.—*M. I. Berger, Secretary The Vote-Berger Company, La Crosse, Wisconsin.*

A WARNING.

REPLYING to your recent favor making inquiries relative to my views on the immediate future of Independent telephony, wish to say that of course the recent financial flurry has created possibly an undue amount of caution on the part of telephone men generally, which will tend toward retrenchment, yet on the whole I think the outlook exceedingly flattering. The great reduction in the price of copper and consequently of copper products should encourage telephone men to special effort in the matter of building and rebuilding their properties and especially should it stimulate the building of toll lines so badly needed among Independent companies. The Bell company's overtures to the Independents for toll connections upon almost any terms that the Independents may mention is perhaps the most subtle and insidious of the Bell company's attacks and cannot fail to redound to the very serious injury of the Independent companies directly concerned as well as to the general cause if their offers shall be seriously considered. The fact that Independent companies with Bell proclivities have almost invariably in the past suffered substantial injury because of that relation should be a warning that everyone should heed.

With kindest regards, Very truly yours.—*C. B. Cheadle, Secretary Illinois Independent Telephone Association, Joliet, Illinois.*

OUTLOOK MOST ENCOURAGING.

REPLYING to your esteemed favor of the 3rd inst., with reference to the telephone outlook for the year 1908, I beg to say that it seems most encouraging. Confidence seems to have been restored to a very considerable extent, and the recent statement by the Chicago Clearing House Association shows a condition almost unparalleled in the history of the Chicago banks. Coupling this with the enormous crops which have been produced during the year just closing, and with the further fact that the present financial condition has no real reason for existence, with the exception of the loss of confidence in some of the so-called Captains of Finance, it occurs to me that we have every reason for believing that the year 1908 will open up strong with present conditions that will be most satisfactory to telephone companies. Our business, which during the last two or three months has suffered considerably, is already beginning to pick up, and November closed with a first rate showing, all things considered.—*H. S. Durant, President Durant Electric Supplies Company, Chicago.*

H. S. Durant.

FUTURE PROMISING.

UNDER normal financial conditions in 1908, there will unquestionably be a very large development among Independent companies. The financial flurry has brought to the attention of many, for the first time the fact that telephone service rates are not affected by market changes; that the rental payments are distributed through the year, and are so small as not to be a burden upon the average subscriber; that the income of a telephone company is less affected by financial disturbances than is that of any other important business.

J. B. Ware.

These facts force the conclusion as heretofore claimed, that the telephone business reasonably handled, as most Independent companies are, is an admirable and safe one for investment purposes.

Owing to the local character of the Independent telephone companies, one must conclude, after recent experiences in the commercial world, that there will be even greater local confidence in such companies, and with a correspondingly larger demand for such securities than in the past.—*J. B. Ware, Ex-President of the Michigan Independent Telephone Association.*

FROM KENTUCKY.

I HAVE yours of the 3rd instant, and in reply will say: The recent temporary flurry in money affairs has not effected materially the progress of telephone development in the south. In established plants, no noticeable change in the steady demand for additional service is apparent, and

the plants are growing at the same rate as heretofore. This, of course, is due to the peculiar business of a telephone company which, by its very nature, is affected by neither good times nor bad times, bad weather or good weather, poor crops or heavy crops. The telephone has become almost as much of a necessity as the kitchen range.

There has been no noticeable diminution in the number of new ventures; franchises are being obtained because new plants will be profitable, self-evidently.

Long distance toll business has been increasing with us week after week. Business that was heretofore done by sending representatives to meet face to face, seems to be done just now over the long distance telephone at a lower cost.—*L. G. Parker, General Manager Central Home Telephone Company, Louisville, Kentucky.*

FROM MICHIGAN.

YOUR very kind letter in which you ask for my opinion as to the prospects for the coming year for Independent telephony, at hand and noted.

W. B. Woodbury.

We are firmly of the opinion that the year 1908 will mean much to the cause of Independent telephony, not from the standpoint of new projects, perhaps, because it does not seem likely that financial interests will give any decided encouragement to new enterprises until after the presidential election. Operating companies will, however, grow bigger and stronger within themselves from a desire to put the house in order and to develop the plant to its highest earning capacity. Despite the talk of "tight money," it is generally thought by those in touch with conditions that from March 1st on, there will be a period of "easy money" on account of the accumulation of currency by banks to be in a position to meet any contingency that might arise from present conditions. This money will necessarily have to be put back into the channels of legitimate trade in order to earn its proportion of the interest charge. Much of this money should be available for development of legitimate telephone enterprises.

Good business can always get financial support to carry out conservative money making policies, and for that reason we believe that the telephone business will be developed to a wonderful degree during the coming year.—*W. B. Woodbury, Secretary and Treasurer Home Telephone Company of Detroit.*

FROM MAINE.

IN complying with your request for a statement as to the outlook of the future of the telephone business, will submit the following:

The future outlook for Independent telephones in the New England states I believe is better at this time than it has ever been before. The people have come to a point where they realize that in order to secure first-class service competition is necessary, and during the past year there have been a great many small Independent companies organized throughout Maine, New Hampshire and Vermont, which are building up the rural communities of these three states.

In connection with this on the northern border of New Hampshire and Vermont in Canada there has been a great deal of development done by Independent companies, and the coming year will no doubt see toll line facilities covering this vast territory.

Financial matters throughout this section are apparently easing up, and unless something unforeseen happens between now and the time possible to commence active construction in the spring of 1908 there will be ample money in the field to finance new enterprises and extend old ones, and taken on the whole the outlook for the Independents throughout this section is exceedingly bright.—*F. E. Ebersole, General Manager The Northern Telephone Company, Portland, Maine.*

FUNDAMENTAL CONDITIONS SOUND.

THIS is in reply to your letter of Dec. 3rd, asking about the telephone outlook for the coming year. I am inclined to feel optimistic. Fundamental conditions appear to be sound. The recent scare should have the effect of making the telephone and other business continue with less madness and greater certainty. Telephone activity must continue because people must use the telephone. I look for sounder financing, which will mean more stable progress and greater real prosperity.—*Kempster B. Miller, of McMeen and Miller, Chicago.*

FROM VIRGINIA.

IN reply to your inquiry in regard to the outlook for Independent telephone construction in this locality, I beg to say, that in 1907 telephone construction has been confined largely to such work as the various exchanges have found to be absolutely necessary. This has been due to the condition of money matters and the ridiculous price of copper.

It seems now that we are approaching a different condition. The price of copper has fallen to a figure which somewhat approximates its value and, if we can believe reports from those who ought to know, the present figures will not soon be subject to any material change. We read daily of the "restoration of confidence"; the best posted authorities seem to be of the opinion that the finances of the country are already in the convalescent stage, and farm products are fully equal to the average of the last five years.

So that with copper at a near-reasonable figure, and a clearing of the financial atmosphere, it would seem that the year 1908 should mark the beginning of a construction era in Independent telephony, not only to take care of the then present needs, but to make up for time lost during 1907.—*Albert Parlett, Ex-President Virginia Independent Telephone Association, Bristol, Virginia.*

FROM CALIFORNIA.

MY observation of the telephone industry has been confined to the Pacific coast region during 1907. For the year to come I anticipate a greater Independent development in that territory than has been gained during any previous year.

One of the reasons for this belief is the record made by Independent companies during the late depression. Few lines of business have done nearly as well, and most of them worse.

I am equally sure that the business of 1908 will be done better on account of the lessons taught by the late depression.—*S. G. McMeen, of McMeen and Miller, Chicago.*

FROM TEXAS.

REPLYING to your favor of the 3rd inst., I beg to state that the prospects for the complete development of this portion of the state of Texas have never been brighter. Indeed, I believe that unless financial conditions should remain in their present stringent condition, the close of 1908 will see North Texas thoroughly covered with superior Independent long distance lines while at the present time there are but two or three cities of any importance that do not have the local service.

In this particular section we find the local capitalists ready to take our securities and as long as we keep the

"promoter" and "grafter" out of our midst the business will prosper and our securities will be sought after by investors.—*C. A. Shock, Secretary and Treasurer North Texas Telephone Company, Sherman, Texas.*

MORE TELEPHONING IN HARD TIMES.

PEOPLE seem to do more telephoning in hard times than in prosperity. Our toll records show that November was a better month than October for toll receipts and December will at the present rate exceed November. I believe that 1908 will be the most prosperous year that Independent telephony has known.—*T. B. Lee, General Manager State Mutual Telephone and Telegraph Company, Washington, Pennsylvania.*

FOUNDATION ENDURING.

REGARDING the outlook for 1908, I am satisfied that the era of truly successful Independent telephone operation has begun, by reason of enforced economies. I do not think the manufacturing outlook is so cheering, since enforced economies and gross manufacturing output are not congenial companions. The recovery will be slow, and will cover a period of two or three years. Even this prediction has a shadow of comfort, because the manufacturer will have opportunity to slow up and perfect the various devices necessary to good apparatus.

The telephone business will soon prove itself the greatest electrical industry and our manufacturing plants will return to a permanent business double the business of the first six months of 1907. I see no need of anyone becoming discouraged. The present standstill is a blessing, and will result in longer life and comfort to every one concerned in it.

The Independent telephone came into life on the crest of the prosperity wave and its foundation is too deep and enduring for any flurry or panic to dangerously disturb the superstructure.—*J. C. Kelsey, Chicago, Engineer for Fisk and Robinson.*

TOO EARLY TO PROPHESY.

THANKING you for remembering me in connection with the subject matter of your esteemed favor of December 3rd, I beg to explain that at this time I would not dare hazard an opinion in regard to the telephone outlook for next year.

Possibly after the meeting of International Independent Telephone Association and after consultation with operators who will be present upon that occasion, I hope it will be possible to outline the situation and give it a rose-colored hue, but until that time one would hesitate to do much in the way of prognostication.—*J. R. Wiley, Western Sales Manager Standard Underground Cable Company.*

FROM MASSACHUSETTS.

YOUR letter of the 3rd, addressed to me at Houlton, Maine, has been received and noted.

I believe that the coming year will prove the greatest yet for Independent telephony in the New England states. The year just closing has been a good one for most companies. as they have taken care of lots of new business besides paying considerable attention to the question of toll lines. Next year will see a great many good metallic toll lines completed and this will encourage the building of a number of new plants besides making the demand greater for those already operating.

The number of new incorporations in Maine and the fact that the companies now operating there show a desire to be strictly Independent, lead us to believe that prospects are unusually bright for a large increase in the number of subscribers next year.

Vermont and New Hampshire have experienced good gains this year and at present there are a number of new companies in the northern part of these states that are very active and have enough work ahead to keep them busy the greater part of next season.

Whether or not the Independents start in Boston next year, Independent telephony in the New England states never had a brighter outlook and most companies now have plans made that will keep them busy the entire season.—*M. E. Crow, President of the M. E. Crow Electric Company, Worcester, Massachusetts.*

A GOOD BUSINESS YEAR.

REPLYING to your letter of December 3rd, asking my opinion as to the telephone outlook for the year of 1908:

The present business depression at the beginning of a presidential campaign and its effect on the sale of securities in general will retard to some extent the exceptional growth of operating companies, who rely for development funds on the sale of their securities in the large money centers.

Local or Independent telephone development in which we are interested, covering as it does the medium-sized cities, small towns and rural districts, is surrounded by prosperity. Money that was sent east from these localities on account of the high interest rates is fast coming back for local investments. Independent telephony will get its share, and we look for a very good business the coming year.—*J. P. Cracraft, President Cracraft-Leich Electric Company, Genoa, Illinois.*

FLURRY NOT AFFECTING TELEPHONES.

WE do not anticipate that the recent financial flurry will seriously interrupt Independent telephone development in this part of Iowa. Our cities and towns are already reasonably well supplied with satisfactory Independent service. I do not know of a single rural community of any considerable size that is not so supplied.

Therefore, it seems to the writer that the natural and constant improvement, together with the gradual picking up of those few residences not already supplied, are the only lines of growth that could reasonably be expected in the territory we are acquainted with, and we believe this growth will be accomplished almost as rapidly as would have been the case had there been no financial stringency. —*J. H. Shoemaker, General Manager Corn Belt Telephone Company, Waterloo, Iowa.*

GOOD OUTLOOK FOR 1908.

IN rely to your valued favor of the 3rd inst., in reference to the outlook for 1908 telephone business, would say from all information we can gather it looks to us that there is going to be an unusually large business for the next year.

We believe that the general prosperity in farming communities has created a buoyancy of feeling which will cause the continuance of telephone installation.—*W. N. Matthews & Bro., Manufacturers of Telephone Specialties, St. Louis, Missouri.*

ONLY WALL STREET IS SICK.

RESPONDING to your request for an expression of opinion regarding business conditions for 1908:

We have had a great "panic" (?)—one that caused the whole financial and commercial world, as well as our national Government to "sit up and take notice," and upon looking around found that Wall street was ill—a part of its "system" out of order.

It was intoxicated with the excitement of high finance. Noted doctors of finance were called in consultation. Hypodermics and injections of "gold" were administered in great quantities. The patient, while near death's door, soon recovered and quickly sobered up, and is back at work again—better, wiser, and stronger than before.

The so-called panic came out of a clear sky. It was so

sudden and unexpected, it shocked the business world, but aside from a temporary suspension, to catch our breath, so to speak, the panic (?) did no great harm. In fact, it was a blessing in disguise, as it has taught Frenzied Finance a needed lesson it will not soon forget.

The United States is rolling in wealth. It is the richest country on the globe to-day. It has only begun to build and enlarge and improve. The telephone business must and will of necessity keep step with this natural condition, and grow faster and greater, and with it, the writer's business, "Underground Conduit," plays no mean part and will get its share.

While a national election will take place in 1908, with its usual business disturbances, there is no reason to expect these disturbances in the coming election as there will be no great question affecting the whole people to be decided, and business will undoubtedly pursue the even tenor of its way.

We predict a healthy, substantial and profitable business for 1908.—*E. F. Kirkpatrick, Vice President of B. S. Barnard & Company, New York and Chicago.*

HOPE AND WORK.

REPLYING to your valued favor of the 3rd inst.. will state that I have a great deal of hope in the future business stability of this country. I am not, however, waiting for business to revive. I am here at the factory nearly every minute of the day sawing wood as hard as I know how. We are going to stay right here at the old stand in this business, whether times get good or bad. As stated above, we can only hope and work.—*H. O. Jackson, President of the American Clock Company, Chicago.*

1908 WILL BE A GOOD YEAR.

ANSWERING your inquiry of recent date relative to the outlook in the Independent telephone field for the coming year, beg to say that we look for great increase in the business generally next year over that of 1907.

I believe the experience of this year in financial matters will bring very clearly to the notice of all investors the stability and desirability of all worthy Independent telephone securities as an investment, and am impressed with the fact that all operating companies are in a much stronger position than ever before; most of them are better organized, giving better service, showing larger earnings, and the people generally have come to recognize the fact that it is a permanent and enduring business.

Many companies have refrained from making extensions and improvements during the past year on account of the high price of material and the scarcity of money.

These improvements must be made to take care of the increasing growth of the business, and we believe that next year will see a general movement in this direction all along the line. We look for a good year in new building as well as in rebuilding and extending.—*S. A. Jones, of Jones and Winter, Chicago.*

FROM SOUTH DAKOTA.

IN response to yours of the third inst. regarding the telephone industry in South Dakota, will say that at this time everything is in a prosperous condition.

Most of this year's building had been provided for before the flurry began, so this year's business has not been affected much by the financial conditions. Crops have been fair but while they are far below last year the prices are much better and it is estimated that the value of total crops exceed last year by $9,000,000.

The price of copper prevented much building of toll lines during the last year but with copper at its present price there will be much of it strung in South Dakota during 1908.

Should the financial flurry pass, as indications now point, next year will be a busy one for the telephone interests of South Dakota.—*E. R. Buck, Secretary South Dakota Independent Telephone Association.*

GOOD BUSINESS IN 1908.

REPLYING to your favor of the 3rd inst., will say that we anticipate a good business for the coming year of 1908. The current year brought us an unusual business and the flurry of the month past has in no way affected our sales.—*T. W. Warner, General Manager Warner Electric Company, Muncie, Indiana.*

PRESENT CONDITIONS TEMPORARY.

REPLYING to your favor of December 3rd, I am of the opinion that the present depression of business is due entirely to the stringency in the money market, and is but temporary and will, I believe, in the end, work to the best interests of the country.

The business heads are going more deeply into the affairs of their respective companies, and scrutinizing more closely the expenditures, than they have for several years past. This is especially true in the telephone business, and cannot help but have a wholesome effect. The money market to-day is much easier than it was two or three weeks ago, and within a very short period, we should be able to take care of the enormous telephone development, which is bound to present itself during the year 1908.—*C. Y. McVey, General Manager Cuyahoga Telephone Company, Cleveland, Ohio.*

TELEPHONE DEMAND GREATER THAN EVER BEFORE.

IN reply to yours of December 3rd, wish to say that the financial flurry is gradually passing off here.

As to how it has affected the local telephone industry, would state that we have gone right along with new work as well as quite a lot of over-hauling, putting up some cable, etc.

The demand for telephones is greater with us than ever before and we have already planned quite a lot of new construction for 1908. All crops here are moving right along at high prices.—*B. L. Fisher, Manager of the Franklin County Telephone Company, Rocky Mountain, Virginia.*

FROM TENNESSEE.

I AM just in receipt of your favor of the 3rd, upon returning after an absence of ten days from my office. Thank you for the opportunity to express an opinion upon telephonic matters, but my time is so engrossed with other engagements that I will not have an opportunity to write such an article as I would care to have published.—*Harvey Meyers, President the Memphis (Tennessee) Telephone Company.*

COUNTRY FINANCIALLY SOUND.

WE acknowledge your esteemed favor of the 3rd in reply to which beg to advise that so far as we are able to judge, the present financial flurry is one which we do not anticipate will materially effect the Independent telephone business for the coming year. That it is having its effect just now is undoubtedly true, but recent letters received from customers who had requested us to hold up shipments, show a decided turn for the better, as they are now ordering their shipments ahead and almost universally express the opinion that construction will go forward as anticipated.

Inquiries are increasing every day and the general outlook is undoubtedly fine for a good year in 1908; that the country is sound financially and that we should enjoy a prosperous year, is unquestionably true, and we have very little fear that business will continue good, notwithstanding the recent flurry.—*J. H. Montague, Sales Manager L. M.*

Ericsson Telephone Manufacturing Company, Buffalo. New York.

PROSPECTS GOOD.

THE telephone industry represents one that has brought great economy to the public, and the future of this industry will be less affected by the present conditions than any other. The people who are demanding the introduction of the telephone consist largely of farmers who have enjoyed great prosperity. Consequently, we anticipate that the sales for 1908 will be equal to, if not in excess, of those of 1907.—*H. G. Robbins, Treasurer Nungesser Electric Battery Company, Cleveland, Ohio.*

FROM NEBRASKA.

IN answer to your letter of December 3rd, relative to the telephone situation for 1908, speaking about our own territory, the state of Nebraska, I see the greatest possibilities for good sound financial telephone undertaking, from the fact that we have a crop valued at $210,000,000, and if it was not for the fact of bank agitation we would in no way feel the money stringency. In fact our bank statements show all the way from twenty-five to forty per cent currency on hand, a condition which is unknown only in the best of times and I believe there will be more and better long distance lines built in the state of Nebraska in 1908 than in any three years previous.

I confine myself practically to long distance lines from the fact that there are very few important towns in this state without an Independent system either in operation or building.—*W. J. Stadelman, Secretary and Treasurer Telephone Construction Company, Norfolk, Nebraska.*

TELEPHONE BUSINESS NOT AFFECTED BY PANIC.

IN reply to your letter of the 3rd, the Independent telephone industry is gradually getting down to a solid business and financial basis, and wild cat adventures and strenuous financiering are things of the past in the business, not because of any little financial flurry, but because the business itself demands it. Telephone business is among the industries least affected by financial panics.—*R. Max Eaton, General Manager Niagara County Telephone Company, Niagara Falls, New York.*

FROM VERMONT.

IN reply to yours of Dec. 3rd, each year brings a large demand for Independent service in Vermont and New Hampshire, and the outlook is very bright for season of 1908, and I believe there will be more telephones installed in this territory by Independent companies than in any two of the past years.—*H. W. Buchanan, President Vermont and New Hampshire Telephone Association, Barton Landing, Vermont.*

REEF OUR SAILS.

REPLYING to yours of the 3rd inst., it appears to me that it is a little early in the season to forecast the outlook from a telephone standpoint for the coming year. If the financial and political fright had passed over and the conditions throughout the country had assumed a nearly normal state, we would be in a better position to express ourselves on such a subject.

The telephone has become a real necessity, not only to the business man, but to the housekeeper, so much so that it is one of the last expenses to be cut off, so that unless we are confronted with a general business depression, I can see little or no prospects of a material change in the present telephone boom.

I am, however, inclined to the belief that the construction work during the present year will be limited to that which is absolutely necessary, that there will be but few new projects started unless arrangements have already been made for the necessary money.

Business has been coming so fast to most of us during the past two or three years that we will all welcome at least a partial cessation of hostilities for a few months.

I do not anticipate any material change in the general business, but believe we will all reef our sails and keep close to shore until the present blow has passed.—*H. A. Douglas, General Manager Cedar Rapids & Marion Telephone Compand, Cedar Rapids, Iowa.*

OUTLOOK BRIGHT.

ANSWERING your inquiry of the 3rd, the outlook for the coming year is bright in this section of the country; the finanical trouble has in many cases made investors look with greater favor upon home securities and the lower prices of copper and some other construction materials will stimulate building to a large extent.—*C. C. Deering, Secretary Boone County (Iowa) Telephone Company.*

FROM NORTH CAROLINA.

REPLYING to your favor of third instant, would say that the outlook for Independents for 1908 in this part of the country is very promising and satisfactory. Our people accept the idea that competition insures better service and lower rates and give us their liberal support. Extensions will be made only when it will increase net revenue. We have passed the experimental stage and do not need dead heads on our lists.

Nineteen hundred and eight will be spent in maintaining a high grade service and strengthening our position and equipment, endeavoring to merit the confidence that gave us existence. The management of some large corporations in the past crystallizes the sentiment of managing our own affairs. Legitimate enterprises, experience and conservatism assure a brighter future for Independents.—*William A. Wynne, President North Carolina Independent Telephone Association.*

THE POINT OF VIEW.

IT is rather inspiring in these days of uncertainty to have such positive, optimistic opinions stated without reservation, as expressed in your letter of the 3rd inst. in regard to the business outlook in the Independent telephone industry for 1908.

I sincerely wish that I could say that I feel as you do. I hope that you take the right point of view.

I shall be gratified and satisfied if in 1908 we approximate the business of 1907.—*George A. McKinlock, President Central Electric Company, Chicago.*

FROM MINNESOTA.

I HAVE your esteemed favor of December 4th.

I am hardly optimistic enough to believe that 1908 will be the greatest year that the Independent industry has known. I am quite sure, however, that it will be a year of vast possibilities, profitable returns, an excellent volume of business, and generally speaking, on a cash basis. I am more familiar with the great northwest and have no hesitancy in saying that indications for this particular section bear me out in a confident belief that Independent telephone development will exceed that of any past year.

Secretary Wilson's report to which you refer is unassailable and bears more weight than the words of wisdom which fall from our "Wall street prophets." And throughout the northwest the conditions which make possible this increased volume of business for 1908 are due to the three following reasons:

The vast number of farms and lands disposed of during 1906 and 1907 will be pretty generally peopled, and the soil made productive. More, and still more land is on the

market and immigration continues to flow into the "promised land."

There is plenty of money at hand merely waiting a legitimate outlet. Eastern exchanges are quoting "gold bricks" at too high a price to even interest our western investors. This money will go into the building up of the richest and most productive farming section of this great land. South Dakota, with an increase in crop values of fifteen million over 1906, North Dakota even better, Canada full of wheat, Winnipeg bank deposits increased fourteen million, Wisconsin conditions the best, Iowa with a three hundred million bushel corn crop, Nebraska with the most valuable hay crop in its history, Minnesota's increased wealth, and from a hundred and twenty-five thousand square miles in the Spokane territory we have an average value in products of one thousand dollars for each family in the district. Personally I am under the impression that for every dollar that we had in this part of the country a year ago, we now have a dollar and twenty cents. There is no question but that the active development throughout the northwest demonstrates a remarkable future for Independent telephone interests.

A third reason may be summed up briefly. Active competition, broader telephone education of the people, a class of modern apparatus adapted to all conditions of service and a recognized value which the telephone means as a time saver in our social and business affairs, in fact, its absolute necessity where time is a factor. In this rapid age the farmer now demands a telephone as the first of his necessities, when only a few years ago he was under the impression, that having gone without it for twenty-five years he had no use for it. Moreover, farm lines mean the establishment of exchange plants. In towns of only 300 to 400 population there are to-day many exchanges of only forty local subscribers who are furnishing service to 300 or more farmers and doing a large toll line business.—*J. J. Nate, Northwestern Sales Manager Stromberg-Carlson Telephone Manufacturing Company.*

1908 A PROSPEROUS AND SUCCESSFUL YEAR.

REPLYING to your inquiry of the 3rd inst., beg to state our opinion as to the outlook of the telephone business is that the next year's business will be the most prosperous and successful one, both in respect to growth of subscribers and revenue, with the resulting increase in profits, no small part of which result flows from our larger experience in the business and superior service due to improved equipment with better operation and maintenance.—*H. Linton Reeber, General Manager Kinloch Telephone Company, St. Louis, Missouri.*

AN ENCOURAGING OUTLOOK.

REPLYING to your favor of 3rd inst. in reference to the outlook for the Independent telephone industry during the year 1908, we all hope that the optimistic view you take of the situation may prove correct. At the present time money is very hard to secure, and gilt-edged securities find no purchasers in this section of the country.

We have assurance from all the bankers that this condition will change after the first of the year, and we sincerely hope such will be the case, and that 1908 will be the banner year for Independent telephony.—*Frank B. Hall, General Manager Beaver County Telephone Company, Rochester, Pennsylvania.*

INDEPENDENTS SHOULD RAISE RATES.

YOURS of the 3rd received. Most of my time and thoughts during the past year have been taken up entirely with our own local telephone conditions.

In a general way I see nothing in the future that should in any respect discourage Independent interests, either manufacturing or operating. The serious mistake that has been inadvertently made by Independent companies has been the fixing of a too low rate for service. This should be corrected and I think may be if properly submitted to the public. In some degree we are endeavoring to remedy it in Rochester. I enclose herewith circulars that have recently been sent out to our subscribers, which will explain our attitude on the subject.—*George R. Fuller, President Rochester Telephone Company, Rochester, New York.*

CONSTRUCTION WORK UNIMPEDED.

REPLYING to your communication of the 3rd inst., will say that the present financial condition of the country has not affected the new construction in this section of the country. The bulk of the year's construction had been completed before the financial depression set in. At no time have our banks ceased to pay currency.

The year 1908 will, undoubtedly, be one of the most prosperous years in the history of the Independent telephone industry, and much new construction will be done in West Virginia during 1908. I do not believe the financial condition of the country will retard the development in the telephone field. The financial condition is clearing up throughout the entire Ohio valley and West Virginia. The securities of our companies have not depreciated during the present financial crisis, and have maintained their standing at par in the community, and regular quarterly dividends of 2 per cent have been maintained on all stock.—*A. C. Davis, President West Virginia Independent Telephone Association.*

YOURS of Dec. 3rd at hand and contents noted. We have every reason to believe that the next year is going to be a "hummer" for business. We are making some large contracts for anchors to be taken out the coming season, and the inquiries for our anchors are very good indeed for this time of the year. We think the great falling off in the price of wire will induce a great many telephone companies to do a large amount of constructing. If they do, of course this will make the anchor business very good. We are accumulating a large stock of anchors ready for the spring business, and will be in position to make prompt shipments and take care of all customers promptly during 1908.—*G. H. Miller, President, The Miller Anchor Company, Norwalk, Ohio.*

IN REPLY to your favor of December 3rd, regarding the telephone outlook for next year, I wish to say that Nebraska expects to make more progress during the coming year than she has been able to make in any previous year.

The completion of the Independent exchange in Omaha, our metropolis, connects us with the last important city of our state. The Independent companies are locally owned and on that account it is not hard to secure new funds for extensions or rebuilding.

The recent financial disturbance has caused a great many people to seek home investments rather than those at distant points. A great many improvements are planned for next year in toll line construction, and as I have said before, I believe it will be our most successful year.—*R. E. Matteson, Secretary the Nebraska Independent Telephone Association, Lincoln, Nebraska.*

An exchange affirms that a young lady on a rural telephone line, where a station had recently been installed, became so much interested in what was going over the line that in grinding coffee she gave one long and one short turn of the crank on the coffee mill, then exclaimed "Hello!"

A Fight With an Octopus

By Paul Latzke

The Story of the Bell Company's Rise to a Power that was second only to that of the Standard Oil Company—The Betrayal of Friends and Associates, The Sacrifice of Great National Characters and the Desperate Purpose of a Fight that was Carried Straight into the White House

A FOREWORD.

[This story should appeal especially to those who have good, red American blood in their veins. It is the story of a magnificent fight that was won against overwhelming odds. It is the story of a smug coterie of "Boston gentlemen" of the immaculate type, put to flight by a few sturdy men out of the west. It is the story of a low, scheming campaign of greed, that was turned into a rout by a fine, sentimental, American citizenship. It is a story full of dramatic interest, not because of the manner of telling, which is simple and commonplace enough, but because of the facts it relates.

It is the story of at least one trust that was "busted." It is a story that, while dealing with the details of an industrial war, will interest even the women, for it is full of good, clean, honest fighting, of the deeds of men who stood shoulder to shoulder under the Stars and Stripes, and, in the name of American freedom and independence, lined up against the most complete and relentless and successful monopoly of the times—and beat it to a pulp. It is a poor sort either of man or woman who cannot find somewhere in the record of these fighters the story of a deed that will stir the pulse.—THE AUTHOR.]

CHAPTER I.

THE WANING OF THE POWER OF THE TRUST.

TWENTY-ONE years ago, before the supreme court at Washington, this dramatic forecast was made during the lawsuit over the Bell patents:

"The whole business was cradled in fraud. Mr. Bell's attorneys had an underground railroad in operation, between their office and Examiner Wilber's room in the patent office, by which they were enabled to have unlawful and guilty knowledge of Gray's papers, as soon as they were filed in the patent office.

"If this court finds in favor of the American Bell Telephone Company, it will enable these plaintiffs to perpetuate the fruits of this fraud for many years, and to fasten on the necks of the American people a gouging monopoly, from which there will be no escape, even after this patent has expired; for, by that time, this corporation will have so wound its tentacles about the community that only an uprising of the people, such as is not conceivable, will be powerful enough to shake it off."

The court *did* find in favor of the Bell telephone company, and the effect of this finding was truly according to the prophecy. It fastened "a gouging monopoly" on the necks of the American people. But there stopped the foresight of the eloquent lawyer. The "uprising of the people," which he deemed inconceivable, has come to pass. The telephone monopoly has been shaken off. In spots, here and there, it still holds control; but, in the nation as a whole, it has been worsted. To-day it operates approximately three million telephones, while the people (for the opposition companies are truly the people, and therein lies their strength) have approximately three and a half million.

There are over 6,000 separate Independent operating companies, with something like 320,000 stockholders. Many of these companies are run on the mutual or co-operative plan, every subscriber being a stockholder. But the vast majority are conducted as general investment enterprises, under the direction of high-grade experts. Their equipment is the finest and most substantial in the world, their management the most enterprising, and their average commercial success is extraordinary, leading every other public utility enterprise. In many communities, the Independent telephones outnumber the Bell six to one. In some, the ratio is as high as ten to one. The average, where the Independents have a fair foothold, is easily three to one. That the national average is not higher is due to the fact that in some of the larger cities (especially in the east, where the Bell instruments are most numerous) the Independents are only beginning to get into action. In New York City, for example, the Bell has over 270,000 telephones. No Independent company has succeeded, so far, in getting into the city, owing to the political protection the telephone trust has always enjoyed there. But now the Independent forces are knocking at the gates of the metropolis. They promise to have 225,000 telephones in operation on Manhattan Island inside of five years.

It will be tremendous work, this attack on the metropolis, for the Bell company will fight here to the last ditch. New York is the keystone of its business arch. When this keystone is destroyed, or crumbled by competition, the whole arch will tremble. Hence the Bell people have made Manhattan Island their Gibraltar. Its defense will be a spectacle well worth watching.

In the country at large, wherever the trust and the Independents have come together, it has been hot campaigning, and many black chapters have been added to our industrial history by the telephone trust. Courts have been manipulated, city councils corrupted, and the public press debased. There has been wholesale bribery, systematic wrecking, and, at times, violence, almost anarchy. Men who have stood highest in their communities have been induced by the reckless use of money to betray their friends and associates. Lying and chicanery and the basest deception have been employed so freely that they have grown almost commonplace. An army of spies has been in the field for years. National characters have been sacrificed. Four times the fight has been carried straight into the White House.

Altogether, it has been desperate business. But the Inde-

For an Announcement on This Story See Advertising Page 11

pendents, despite their former handicaps, lack of experience and lack of money, have always come out on top in the end. Their victories have been due, undoubtedly, to the fact that their fight is the people's fight. Their successes were probably the earliest manifestations of the general public uprising that came to a head on election day, in November, 1905. The bosses who met their Waterloo in all parts of the country, on that day, were always on the side of the Bell monopoly. They had fattened on its venal generosity for years; they were among its most ardent henchmen. Boss Cox, who fell in Cincinnati, has managed all these years to keep that city for the Bell Goliath, though the rest of Ohio is covered by the Independents. Boss Murphy and Boss Croker and the other Tammany bosses managed to do the same for New York City, though elsewhere in the state —in Buffalo, Rochester, Syracuse, Albany, and scores of other cities, towns, and villages—the field is admirably served by Independent companies. In the office of "Little Tim" Sullivan, one of the most potent among Tammany bosses—there is brazenly in evidence a large tin box, like those one sees in lawyer's offices, labeled, "New York Telephone Company."

In many of the other great centers of population, the Bell has been equally well served by the bosses, so that we find the bare spots on the Independents' map chiefly in the large cities. But gradually these bare spots are being filled in, and the monitory influence of the political upheaval will probably cause the last of them to disappear within the next year or two. When this comes about, the average of about three Independent telephones for every single Bell instrument, that now prevails in the middle west, will probably be nearly national.

CHAPTER II.

THE UPRISING OF THE PEOPLE.

It was in the middle west that the "uprising of the people," speaking telephonically, had its inception; and, from that as its center, the movement spread steadily. As a type of the general conditions there, the figures in "District No. 3 of the Ohio Independent Telephone Association," are fairly illustrative.

These figures show that in the state of Ohio there were in operation March 28, 1907, 299,400 Independent telephones working out of 845 exchanges and controlling 1,723 toll stations. Against this the Bell telephone company on the same date was operating only 145,956 telephones out of 277 exchanges and controlling but 861 toll stations. In other words, the Independents were operating twice as many telephones, more than three times as many exchanges and more than twice as many toll stations in this state as the Bell could show. In seven counties in the state the Bell company had no subscribers at all. The Independents, on the other hand, were represented in every county with the exception of Hamilton, which is practically Cincinnati, where for reasons as previously explained the Bell still has a monopoly. This monopoly, however, is on the verge of breaking down at this writing, and 1908 will undoubtedly see an Independent company installed in that city, so that the last gap in the state will be closed.

Even more instructive than the preponderance of two to one in the number of telephones operated by the Independents in Ohio, is the fact that the Independents had on March 28th, 25,311 individual stockholders in this state, whereas the Bell had less than three hundred. When it is remembered that every one of these stockholders is personally interested in seeing the Independent business thrive and grow, it can be understood what a power we have here for future development, and how inevitable is the conclusion that the Bell telephone company must gradually become of less and less importance. A graphic illustration of this probable course is shown in the figures on increase. The Independents, during the five months preceding the issuance of this report, gained 19,680 stations, while the Bell gained only 845. Here was a lead of over 14,835, or over 300 per cent for this period.

Is it difficult, in view of these figures, to understand why the Bell company no longer exercises "a gouging monopoly"?

In Iowa there are over 1,200 Independent companies, with approximately 30,000 stockholders, and it is difficult to find a farmhouse without telephonic communication. When the question of installing an Independent exchange in Council Bluffs was being opposed there by the usual Bell methods, some of the local merchants compiled figures that showed a situation in the surrounding territory astonishing even to the experts. It was found that, in twenty-one towns and villages, to which Council Bluffs could naturally look for trade, the Bell company had exchanges in only eight, while the Independents had exchanges in all. The total number of Independent subscribers in these places was 3,721, as against 675 Bell.

This was six years ago. Council Bluffs now has a flourishing, up-to-date Independent plant. The politicians, who were blocking the franchise on behalf of the Bell people, were made to see that the trade of these twenty-one places and of dozens of others was drifting to Des Moines, where there has been an excellent Independent plant for years.

Trade, to-day, follows not the flag, but the wire. Hence the city or town that has no communication with the Independent lines that lie like a network over the country soon finds that its business is slipping away. This is an economic argument that, in the end, must always win for the Independents, when they find themselves opposed, at the gateways of the larger cities, by the money and political influence of the trust.

Figures are dry reading. I shall use them sparingly, and only in places where they seem indispensable. But the figures for Ohio and Iowa, and others that I shall give further along, merit careful study, because they show in the most graphic form the story of an industrial fight that stands unique in the world; for here we see a trust—the most perfectly organized trust in the world—actually beaten by the people. This exceptional outcome makes this case the most important chapter in our industrial history—a chapter that every citizen should read with interest, for it may give a clue to the solution of the entire trust problem.

The president, the people, congress, legislatures and governors of states, an earnest, enlightened press, have all battled with the Standard Oil Company. With what result? Standard Oil is more powerful to-day than ever before. It controls the poor man's lamp and the rich man's automobile. The markets of the world are still at its mercy.

The beef trust still makes the price the western farmer can have for his cattle and the price the eastern workingman must pay for his meat. The governing powers of the nation and of the states have shown themselves unable to cope with the combination.

The railroad trust is even now engaging the best attention of a President who has shown himself able to wrestle successfully with almost every other question. In his first encounter, with all the powers of a great government behind him, he was worsted. Only the most sanguine expect that he will succeed, finally, in exacting conditions that will be entirely fair to the people.

The coal trust, the lead trust, the tobacco trust, the leather trust, and all the other great industrial combinations have had their way with us, determining with merciless inflexibility, what we shall receive for our products and pay for our necessities. The people have stood by, apparently helpless, until we have come to believe that the only hope of industrial salvation lies in absolute government control, if not government ownership. It is here that the history of the fight against the telephone trust has such tremendous value, for it shows that, when the people will, they may.

If ever opposition to a trust seemed helpless, it was

against the telephone monopoly. The decision of the United States supreme court, sustaining the Bell patents, was handed down at Washington, in October, 1887, in actions brought by the Bell company for infringement against half a dozen companies operating under the patents of Daniel Drawbaugh and others. This judgment of the court left the American Bell Company with a strangle-hold on the telephone business.

With the trusts in other industries it was, after all, purely a matter of money and methods. They had no legal control of the business they dominated. Any man who owned or leased an oil well might go into the oil business, if he were so minded. The Standard could cripple his markets, through unlawful combination with the railroads, or undersell him with the consumer; but, before the law, the smallest oil producer of the country was on a plane of perfect equality with the oil trust. He could not be stopped by injunction from producing or refining oil. So it has been with the other industries. But behind the telephone trust stood the whole power of the United States supreme court, and, therefore, the whole power of the nation. Under the decision which gave the Bell people the right to do as they pleased with the telephone, no man or company of men could go into the business except as outlaws. The whole force of the government was at the beck and call of the telephone combination to crush out any semblance of competition. It was almost as serious a matter to make and use telephones without the sanction of the trust as it was to make and use money without the sanction of the government.

CHAPTER III.

MILLIONS TO ONE GROUP, RUIN TO THE OTHER.

The decision that made this condition possible was a most tragic thing. It meant hundreds of millions of dollars to a small group of men in Boston, and ruin to hundreds who had embarked in the telephone business under one or the other of the interfering patents. But, of far graver importance even than this, it meant the stifling and monopoly of a public utility that, under free competition, would have saved thousands of millions to the people of the United States.

Had the verdict of the court been anything like unanimous, thinking men might reconcile themselves to the incalculable damage done; but it was only by the slightest tilting of the scales of justice that the prize fell into the lap of Bell and his associates, that the yoke was fastened to the necks of the American people. The court stood four to three. Justices Waite, Miller, Matthews and Blatchford found for Bell; Justices Bradley, Field and Harlan held that Bell's patent should be declared void on the evidence. Said these eminent judges, in giving their dissenting opinion:

"The proof amounts to demonstration, from the testimony of Mr. Bell himself and that of his assistant, Watson, that he never transmitted an intelligible word until after his patent had been issued; while, for years before, Daniel Drawbaugh had talked through his, so that words and sentences had again and again been distinctly heard.

"The latter (Drawbaugh) invented the telephone without appreciating the importance and completeness of his invention. Bell subsequently projected it on the basis of scientific inference, and took out a patent for it; but, as our laws do not award a patent to one who is not the first to make an invention, we think that Bell's patent is void by the anticipation of Drawbaugh."

Poor Drawbaugh! In all history is there a more pathetic figure than his? He was deprived, by the scanty margin of one vote out of seven, not only of a fortune, but also of what, to him, would have been of far greater importance—fame before all the world, as "the inventor of the telephone." Bell's name is a household word in both hemispheres. How many of the people have even heard of Drawbaugh?

A poor, tinkering, village mechanic; a genius, constantly inventing—electrical clocks, rotary measuring faucets, a hundred and one things, out of all of which he never made money enough to provide even the ordinary necessities of life, so that he and his faithful wife were put to it to keep a roof over their heads; nevertheless, he kept at his work constantly, hopefully, enthusiastically. An unlettered wonder-worker, his shop at Eberly's Mills, near the capital of Pennsylvania, was the chief show place of the little community. There, as far back as 1850, he experimented with an electrical device for the transmission of speech over a wire, and there, to quote the three learned judges of the supreme court again:

"As early as 1871, he reproduced articulate speech at a distance, by means of a current of electricity subjected by electrical induction to undulations corresponding to the vibrations of the voice in speaking—a process substantially the same as that which is claimed in Mr. Bell's patent."

One hundred and forty-nine persons were introduced at the famous trial, who testified that they actually saw the Drawbaugh telephone, anywhere from five to ten years before Bell, by his own admission, even thought of such a thing as electrical speech-transmission. Two hundred and twenty witnesses swore they had heard of the instruments or seen them at various times before June 2, 1875, the date of Bell's conception. This cloud of witnesses was swept aside by a majority of the court, on the ground that they could not have testified correctly, though all were of the most respectable character. As they controverted Bell, they must be wrong.

"We do not doubt," held the four justices whose opinion controlled, "that Drawbaugh may have conceived the idea that speech could be transmitted to a distance by means of electricity, and that he was experimenting upon the subject, but to hold that he had discovered the art of doing it before Bell did, would be to construe testimony without regard to 'the ordinary laws that govern human conduct.' Without pursuing the subject further, we decide that the Drawbaugh defense has not been made out."

Before proceeding with an account of the manner in which Bell came upon the telephone and of the uses that the Bell people made of the enormous power the decision of the supreme court gave into their keeping, it may be well to tell of an incident that has never before been put into print.

When Justices Waite, Miller, Matthews and Blatchford held that they could not accept the testimony of the hundreds of witnesses with due regard to "the ordinary laws that govern human conduct," they had special reference to the facts, first, that Drawbaugh admitted on the witness stand that he had visited the Centennial Exposition in Philadelphia, in 1876, where Bell's telephone was first shown, though he swore he had never seen the instrument; and second, that Drawbaugh had never attempted to establish his claims until after the organization, in 1880, of the People's Telephone Company, of New York, with an authorized capital of $5,000,000. This company had been formed to take over the Drawbaugh and other inventions, and for the purpose of going into the telephone field in opposition to the Bell company, then already firmly established. One of the chief figures in the organization of the People's company was Lysander Hill, who, with Senator George F. Edmunds and Don M. Dickinson, made the chief argument against the Bell patent. Mr. Hill was then a patent lawyer in Washington, but is now practicing in Chicago. Arguments were well under way before the supreme court when one of the men associated with Mr. Hill in the ownership of Drawbaugh's claims hunted up the lawyer, and said:

"I have just come from an interview with Judge Miller."

"With Judge Miller?"

"Yes. I think he is the ablest lawyer in the world to-day.

I believe, if we could have his help, after this is over, we could make our way against the Bell people in short order.

"So, I went to him with this proposition: I pointed out that, for a man of his great legal attainments, the salary he is getting as a justice of the supreme court is farcical. He is, as you know, a poor man, and I told him he was certainly doing a great injustice to his family in remaining in his present position instead of going into the field. I showed him that, as matters stand, he will have nothing to leave his people when he dies; whereas, if he should go into practice, he would receive, probably, larger fees than any other lawyer in the world. I finally told him that we, ourselves, would give him a retainer of $50,000 to look after our interests, as soon as he should be in a suitable position to accept it."

Mr. Hill's eyes were bulging big by this time, but he managed to keep cool, and ask:

"And what did Judge Miller say?"

"He didn't say anything," answered the other; "he simply looked at me."

"Did not say 'Yes,' or 'No?'"

"Neither."

"Well," burst out Hill, "you have made a mess of it. I felt certain, right along, that Judge Miller was on our side; now you have put him in a position where he cannot do otherwise than decide against us. Besides, even if he were not in that position, you know we could not give him a retainer of $50,000. You know our stockholders have given up the last money they are willing to contribute to this fight, and that we were just about able to raise funds enough to print our briefs and carry the case into the supreme court. How did you propose to raise this $50,000?"

"I don't know; I thought we could raise it somehow."

"Well, we cannot, and the only thing you can do is to go and tell Judge Miller that you have made a terrible mistake; explain our position to him, and tell him frankly that we could not raise $50,000 if our lives depended upon it."

The man hurried off at once to the residence of the judge, and reported afterwards that he had done as Mr. Hill suggested, but as before, he said, Judge Miller received his statement in perfect silence.

Judge Miller was considered by most practitioners to be the ablest man on the supreme bench at that time. He was revered and respected by all, and his probity and uprightness were never questioned. How much influence, if any, this remarkable interview had in ranging the judge on the side of the majority of the court, no one will ever know. It may have added another to the many strange, almost fateful, incidents that landed the control of the world's telephone industry in the hands of the small company of men who had taken up the exploitation of the Bell patents.

CHAPTER IV.

A STRANGE CHAIN OF INCIDENTS.

This chain of incidents dated back almost a quarter of a century before Bell had even dreamed of electrical speech-transmission. The first link in the chain was forged in 1854, when Bell was only seven years old. On August 26 of that year, the idea of the telephone was first made public by Charles Bouseul, a French savant, who had devoted much time to electrical experiments. Writing in "l'Illustration," the well-known French journal, of the "electric telegraph," Bouseul said, among other things.

"I have asked myself, for example, if the spoken word itself could not be transmitted by electricity; in a word, if what was spoken in Vienna may not be heard in Paris? The thing is practicable in this way."

The writer then proceeded to explain how this marvel might possibly be accomplished, and, in many respects, he described an apparatus that differs only in detail from the "telephone" of to-day.

Bourseul never accomplished anything practical with his experiments, but he pointed a clear path, which was followed later, independently, by Philipp Reis, of Friederichsburg, near Frankfort, Germany. The latter, before he finished, actually built and sold telephones, commercially—not the telephone as we know it to-day, but a very fair instrument for "laboratory purposes." It was he, moreover, who coined the word "telephone." Reis' instrument was demonstrated before the Physical Society of Frankfort, in 1860 and 1861. In a paper read before that society, he introduces his subject by saying:

"By the name 'telephone' the author designates the following apparatus of his own construction, by means of which, with the help of the galvanic current, he is enabled 'to reproduce at a distance the tones of instruments, and even, to a certain degree, the human voice.'"

On a number of occasions Reis gave "long-distance" concerts over his telephone before distinguished audiences; but somehow, he never could transmit speech. Musical sounds and individual letters passed freely and distinctly enough; but, when the letters were grouped into words, the sound transmitted was an unintelligible jumble. Try as he might, the scientist was never able to overcome this difficulty. It was another of the many pathetic failures in this search for the wonderful "electric speech-transmitter." For nothing stood between Philipp Reis and success except the turn of a screw. Seventeen years later the screw was turned, and the modern transmitter, practically as we have it to-day, was born.

What was it that had kept Reis just outside the goal where fame and fortune lay? He always proceeded on the theory that the telephone current must be of the "make and break" order; that is, that the electricity must be turned on and shut off. To-day the whole scientific world knows that the electrical current must be continuous to make talking over a telephone possible. There is no "make and break." The transmitting apparatus is in continuous contact with the line. The variations of sound that produce spoken words are caused, accordingly, as the sound waves strike the diaphragm with increasing or diminishing force. By simply giving one additional turn to the screw that held the diaphragm in his transmitter, Reis would have had this continuous contact. One of his telephones was exhibited at the trial of the Bell patent cases, and the "miracle" was actually performed. The instrument that had remained dumb under all his coaxing came to life and talked.

On another occasion, during a hearing in one of the lower courts, the thing was done by accident. A Reis telephone, brought in as an exhibit by the Bell company, had been so carelessly packed that the diaphragm was jammed against the electrodes, making a "constant contact." When it was "connected up" in court it talked with a glibness which brought consternation to the Bell attorneys, who had hard work to explain to the judge the accidental nature of the demonstration.

Poor Reis! Only his native village, in all the world, does his memory honor. There he lies in the quiet churchyard under a monument which proclaims him the inventor of the telephone in these words cut in the cold marble,—

"Der Erfinder des Telephons."

A sorry reward, the world will probably say, is this epitaph in the poor little churchyard. Yet it is doubtful if Reis himself would complain. He was, above all else, a scientist, and cared less for the world and its rewards than for the conviction that he had done his duty and helped mankind. This no one can deny him, for one of the instruments he made and sold "for laboratory purposes," in order, as he quaintly expressed it in one of his letters, "to give to others, also, the facility of experimenting," helped lay the foundation for the vast telephone systems of to-day.

The continuation of Mr. Latzke's great telephone story, "A Fight with an Octopus," will be found in the February issue of TELEPHONY.

Long Distance Telephone Exchange Equipment

GENERAL DISCUSSION OF A CENTRAL OFFICE INSTALLATION FOR LONG DISTANCE TELEPHONE AND TELEGRAPH SERVICE

By Chas. F. Saenger

The first of a series of articles which will appear during 1908.

ARTICLE I.

WHAT is probably the most complete toll line and telegraph central office equipment in the Independent field to-day has just recently been installed by the United States Telephone Company in its exchange rooms on the eighth and ninth floors of the Electric Building, Cleveland, Ohio.

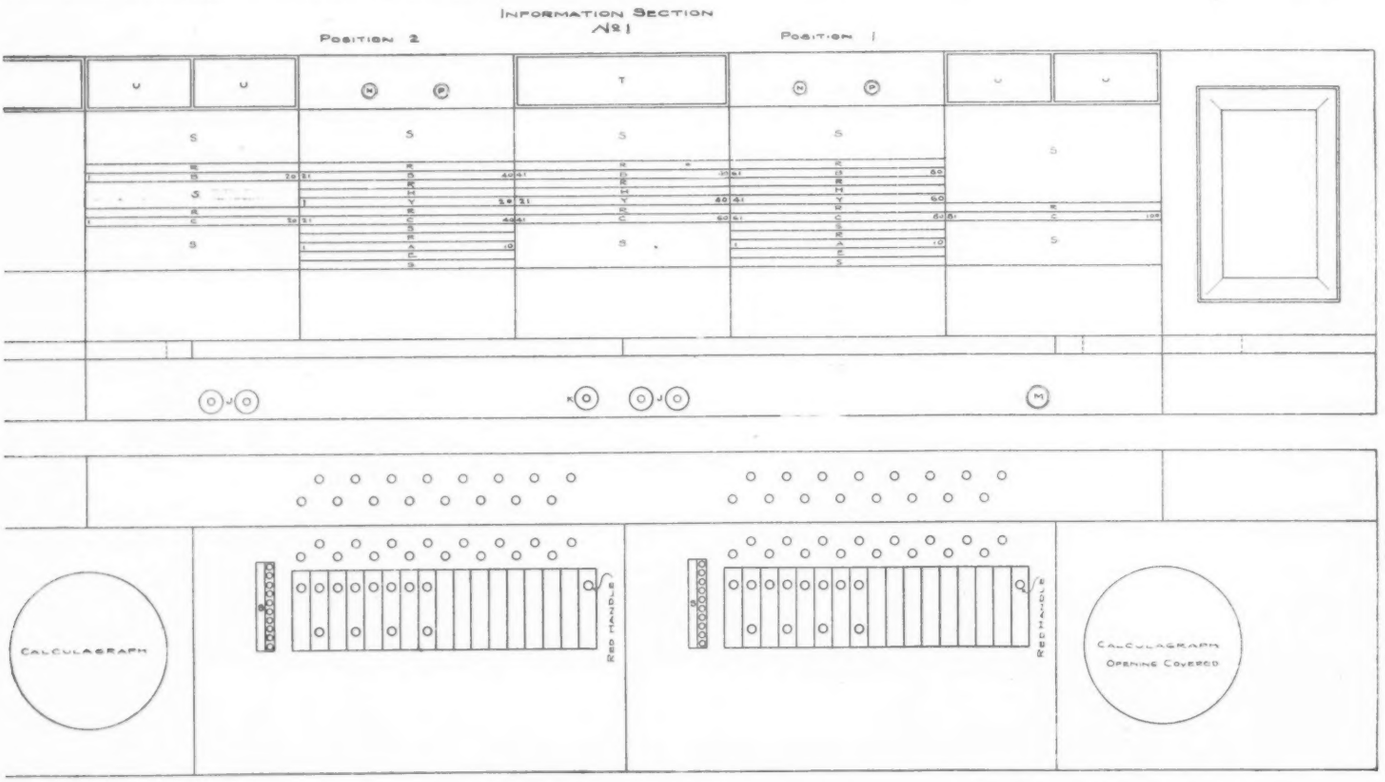
The specifications under which this equipment was constructed and installed were furnished by the writer, whose aim it was to embody every possible feature of advantage both as to equipment and circuits for handling toll line business promptly and in an efficient manner.

The central office equipment consists of a ten two position section multiple toll board of the lamp signal type; a two two position section recording board; one combined chief and assistant chief operator's desk; four supervisory sets; one messenger call box; one three position test board; two single deck, eight set repeater tables; two sets of storage batteries for Morse service; composite sets; relay rack; main and intermediate distributing frames; power board and power machinery.

The tool board is divided up as follows: Section No. 1, including positions 1 and 2, is arranged and equipped as an information operator's section. Sections 2, 3, 4, 7, 8, 9 and 10 are equipped as straight toll line sections. Sections 5 and 6 are arranged and equipped for common or night service sections.

The cabinet work throughout, with the exception of the storage battery and composite cabinets, which are of oak, is of solid mahogany having a dark, dull, smooth finish.

The toll and recording boards are of the low type, the



REFERENCE:
A—Jacks, Answering, 10 per strip.
B—Jacks, Multiple, 20 per strip.
C—Jacks, Service Trunk, 20 per strip.
D—Jacks, Recording Trunk, 20 per strip.
E—Jacks, Lamp, 10 per strip, white caps.
F—Jacks, Lamp, 20 per strip, white caps.
G—Jacks, Lamp, 10 per strip, red caps.
H—Jacks, Lamp, 20 per strip, red caps.
I—Jacks, L. D. Terminal, 20 per strip.
J—Jacks, Operator's.
K—Jacks, Supervisory.
L—Keys, switching.
M—Keys, position.
N—Pilot Lamp, Line, white cap.
P—Pilot Lamp, Supervisory, red cap.
R—Designation Strip.
S—Blank Strip ½ in. Ebonized.
T—Ticket Box, 1 Compartment.
U—Ticket Box, 2 Compartment.
Y—Jacks, Office Trunk, 20 per strip.

Figure 1—Information section of toll line switchboard.

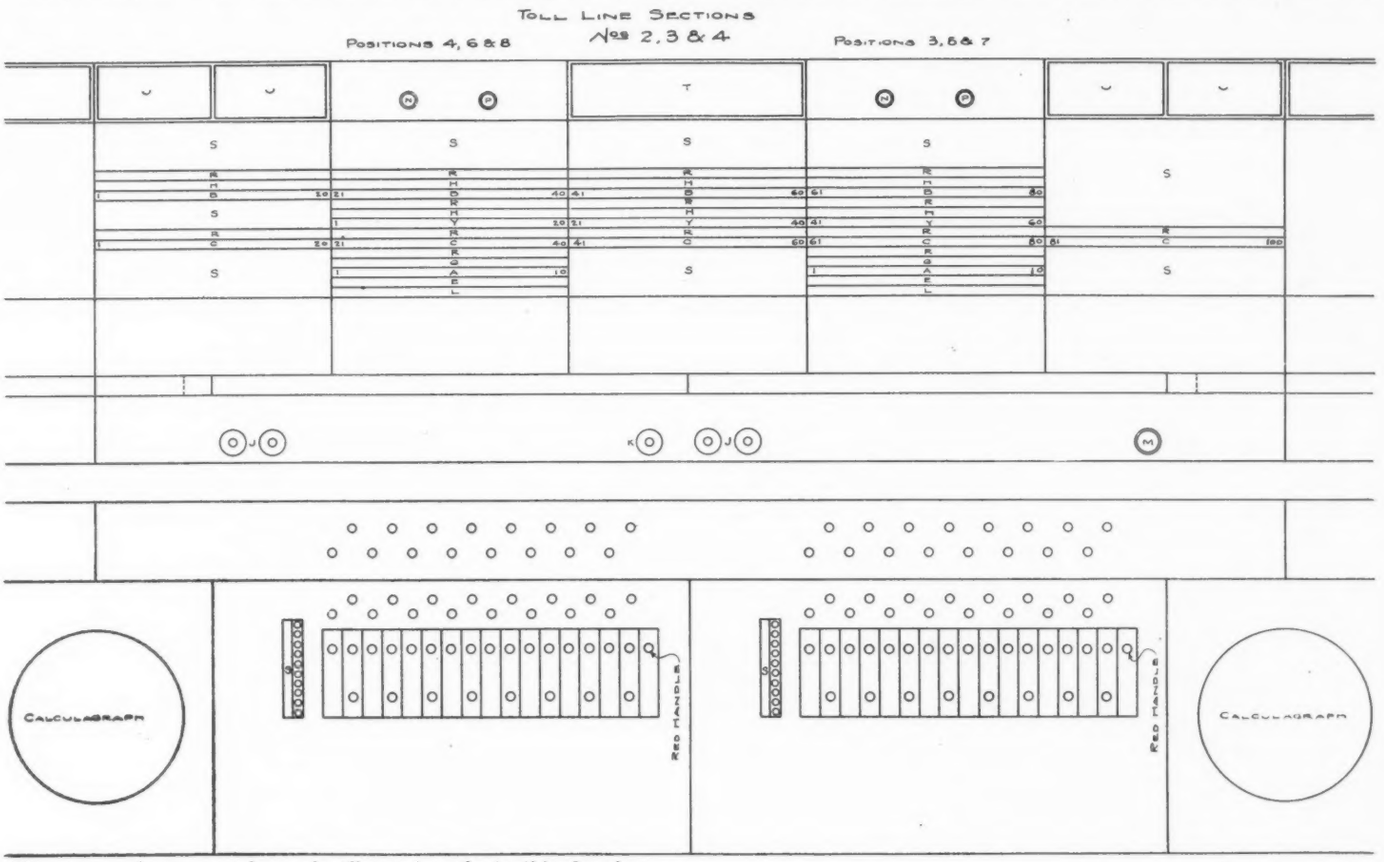
dimensions of the sections being approximately forty-eight inches high, fifty-seven inches long, nineteen inches deep above and twenty-four inches deep below the keyboard. The keyboard is twenty inches wide, including the plug shelf, and thirty inches from the floor. The front below the keyboards and the rear of the cabinets are provided with removable panels. Each board is also provided with a turning or cable section for the purpose of bringing the cables into the cabinet from overhead cable racks. The base below the front removable panels is faced with a six-inch strip of corrugated rubber securely fastened to the base of the cabinet with brass straps. The corrugations are run in the vertical direction for the reason that the rubber is not so easily kicked loose or full of holes. The purpose of the rubber strip is to prevent the operators from marring the base of the cabinet by kicking against it when seated at the board.

The plug shelf up to and on a line with the rear of the keyboards and the jack rail is faced with deep red stained one-eighth inch belt leather to prevent the cabinet work from becoming marred from the impact of the plugs.

Each position is provided with twin pigeon holes mounted in the jack panels in the top of the face of the cabinet for filing tickets. The middle jack panel of each section is provided with a single pigeon hole for filing directories, routing books, etc. All blank spaces above the line of the toll line multiple is filled up with mahogany panels, other blank spaces are filled with one-half inch ebonized blanks.

The upper front edge of the cabinet is provided with a sheet iron channel reflector running the full length of the board, the under side being finished in white enamel and the top in black. Under this reflector are mounted double lamp brackets, one bracket to each position, one side being wired in connection with the 110-volt circuit for regular service, the other with the forty-eight volt storage battery circuit for emergency use. Sixteen-candlepower lamps in connection with the 110-volt circuit and eight-candlepower lamps in connection with the forty-eight-volt emergency circuit are used for illuminating the jack panel and keyboard.

The toll line sections are equipped with the latest type calculagraphs which are mounted in the keyboard shelf between the two positions constituting the section. These calculagraphs stamp their numbers on the tickets, so that should a ticket be stamped at the beginning of a conversation on one machine and on another at its termination the fact will be shown by the two different machine numbers on the ticket. At the beginning of a conversation the number is stamped on the ticket below the clock dials and at the end of the conversation on the arrow on the face of the



The same reference marks as in Figure 1 apply to this drawing.

Figure 2—Toll line section for regular service.

clock dial, thus avoiding confusion due to any errors on account of the difference in time given by the two machines.

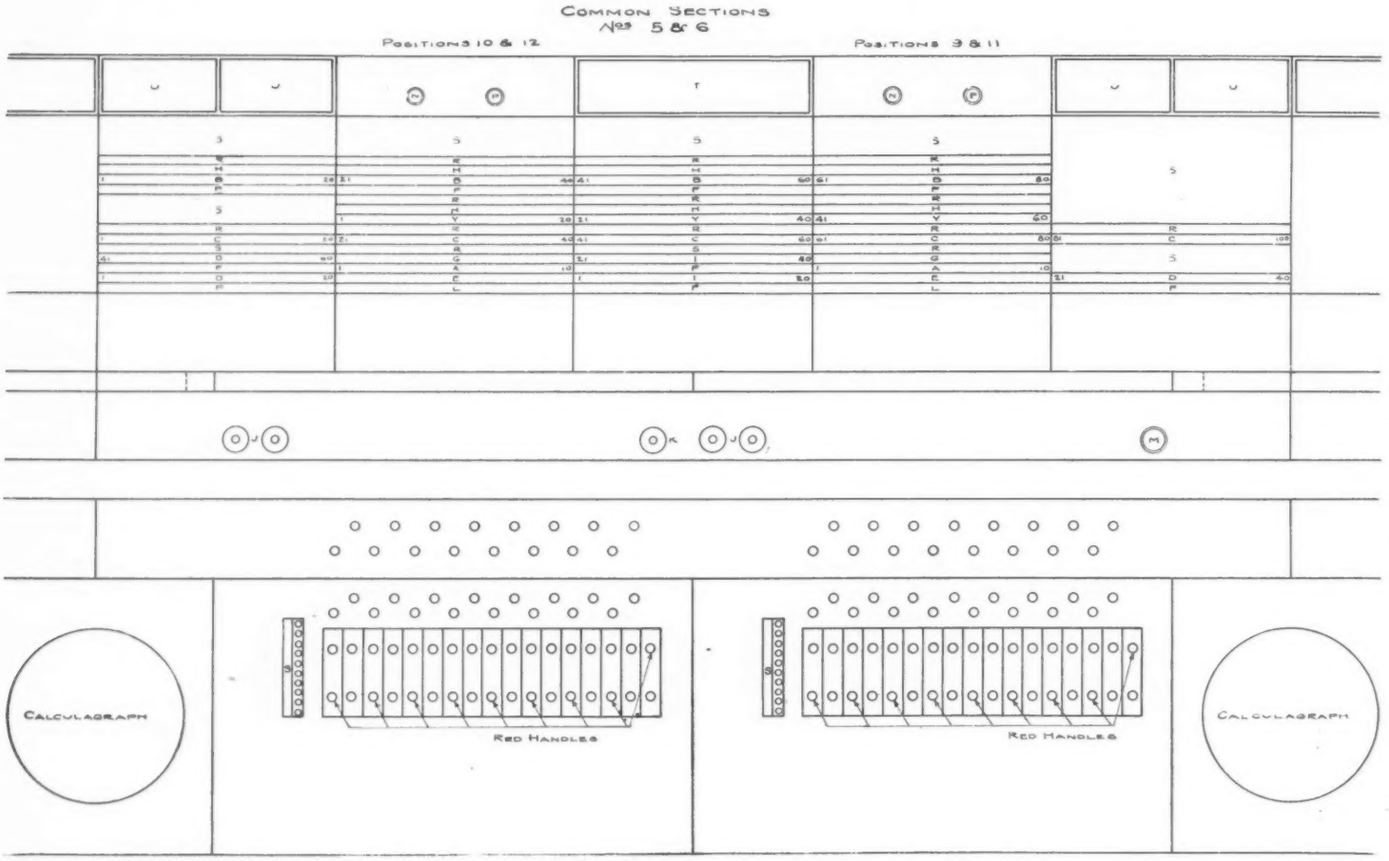
Each section of the recording board is provided with an eight-day clock mounted in the middle jack panel in the blank space above the multiple jacks, and is used by the recording operators in timing their tickets. The writer experienced considerable trouble in securing a suitable clock for this purpose. It was his intention to provide clocks which wound, set and regulated from the face, however, after searching the country over and failing to find any having these features he abandoned the idea and secured a very suitable clock which has many desirable features although they wind, set and regulate from the rear. These clocks are enclosed in heavy bronzed tin cases and protected by a heavy cast iron network frame. The clocks are practically dust proof and cannot be tampered with by the operators, as it is impossible to open the face without removing the cast iron frame, which cannot be done without removing the clocks from the mounting. The cast iron frame is

also a protection against damage from the tools of the inspector when making repairs in the interior of the cabinet.

The arrangement of the apparatus on the keyboards, plug shelves and in the jack panels on the toll and recording boards is shown in Figures 1, 2, 3 and 4.

Figure 1 shows the arrangement of the apparatus in the information section. Figure 2 that of the regular toll line sections. Figure 3 that of the common or night service sections, and Figure 4 shows that of the recording sections. It will be noticed that in Figures 1, 2 and 3 the location of the calculagraphs is shown as being mounted between the sections instead of between positions. Before the cabinet work was constructed, however, it was decided to change their location from that shown in the figures and place them between positions.

The drilling for the cords and plugs is staggered so that



The same reference marks as in Figure 1 apply to this drawing.

Figure 3—Section of toll board arranged for night service known as common section.

purpose of operating supervision in the cord circuit on the "A" board, and are also distinguished by red cam levers.

The order wire buttons have red rubber tops with the letter of the exchange to which the circuit is connected engraved thereon in black. The circle marked "M," located in the front of the keyboard shelf to the right of the operator's position, indicates a position key, which is used for connecting the operator's sets of the two positions in that section together, so that either operator can use any pair of cords in that section. Those marked "J" and located to the left of the operator's position indicate jacks in duplicate and multiple for the operator's head telephone sets; those marked "K" are head telephone jacks wired in connection with the supervisory sets, mounted on the wall. Each section is equipped with one of these jacks and four sections are in multiple with one set, so that a call on a supervisory set

the ringing and listening keys and the supervisory and clearing out signals associated with each cord can be placed directly in front of and in line with that particular cord. The writer also believes that it is much more convenient for the operators to pick up the plugs when arranged in this manner, than when mounted directly in front of each other.

The keys mounted on the end of the escutcheon plates next to the plugs are the ringing and listening keys for that particular cord only; the one mounted on the end nearest the operator is for the purpose of listening in on a conversation, either with or without the secondary side of the induction coil, with the operator's set bridged across the line.

The one key to the extreme right is used for calling the messenger and is distinguished by a red cam lever. The extra key on the common section (Figure 3) is used when recording calls from these sections, and is provided for the

No. 1 can be answered by the supervisor from either Sections 1, 2, 3 or 4 by merely plugging into one of these jacks with her head telephone plug. This obviates the necessity of the supervisor walking across the floor to answer a call direct from the set, should she happen to be standing near the board at the time the call is made.

The circles in the top of the jack panels between the pigeon holes marked "N" and "P" are line and supervisory pilot signals, respectively. The writer believes that this is the proper and most convenient position for pilot signals in all low type, lamp signal boards; they cannot be hidden by the cords when connections are up nor by the body of the operator, as is the case when mounted in the jack rail in the lower part of the panel. In this position they are always in full view and can be easily seen the full length of the board by the supervisors or chief operator.

In arranging the jacks in the jack panels a general scheme was followed out. The calling lamp signals are

placed below the corresponding answering jack, the busy lamp signal above and the designation strip above the entire group. Where switching keys are used they are placed below the jacks or calling signals, the normal position of the plungers being in, and out when signals are switched to the common section. These switching keys are of the locking plunger type and are constructed so as to mount on the same spacings as a strip of jacks.

The toll board has an ultimate multiple capacity of two

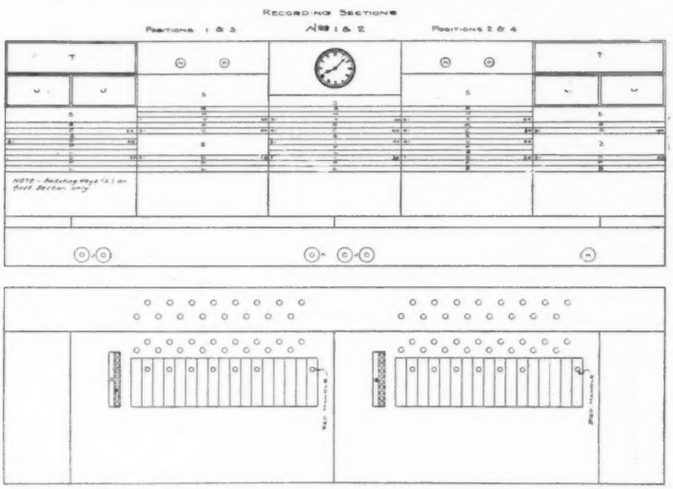


Figure 4—Recording section for handling all incoming calls for toll.

hundred toll lines, eighty of which are at present equipped; one hundred and twenty service trunks with seventy equipped; eighty office trunks with sixty equipped, and forty long-distance terminal trunks with twenty equipped.

The long-distance terminals are multipled on the "B" positions of the "A" board, only the answering jacks and signals appear on the common sections of the toll board

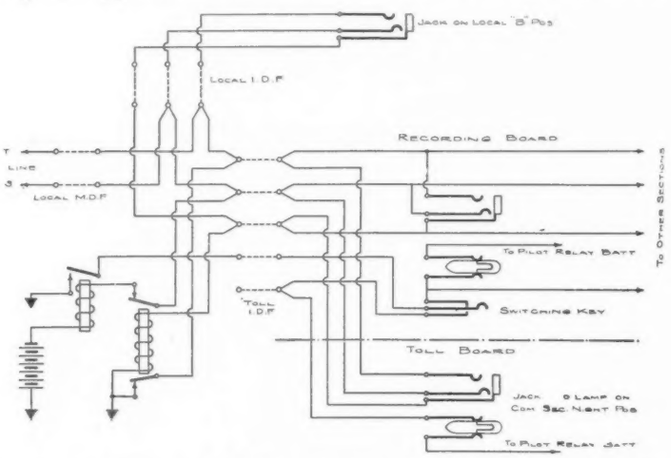


Figure 5—Extension of local subscribers' lines for heavy toll users.

and the recording board for recording outgoing calls. For incoming calls for long-distance terminal subscribers, calls are handled over the service trunks through the "B" positions in the same manner as other calls. These trunks connect subscribers doing a large amount of toll business direct with the toll board without going through the "A" operators. Figure 5 shows the arrangement of the circuit.

TELEPHONES ON ELEVATORS.

EACH of the passenger elevators of the Auditorium and Auditorium Annex hotels in Chicago have been equipped with telephones which are connected with the main switchboard of the Congress Hotel Company. The installation is the first of the kind west of New York, where some of the larger hotel companies inaugurated the system.

THE MEASURED RATE.

DURING a discussion in the English House of Commons recently a plea was made for the measured rate in charging for telephone service. Postmaster General Sydney Buxton, Austen Chamberlain, former postmaster general, and H. W. Forster, a former lord of the treasury who had been appointed chairman of a special committee to investigate telephone rates, all advocated the widest application of the measured service system.

In discussing the matter the London Standard sets forth the advantages of the measured rates as follows:

"The measured rate telephone tariff is based on the equitable principle of payment in proportion to service rendered. The small user (of whom there are thousands and thousands in every town) gets the limited service he requires at a low rate, under the flat rate scheme he pays—if he takes the service at all—the same rate as the large user, and really helps to pay for the large user's service. The large user gets, under the measured rate tariff, the elaborate facilities he requires and the large volume of service he requires at a proportionate rate.

"To put the case in a nutshell, flat rates restrict the development of the telephone service by shutting out the small user, and they impair the quality of the service by causing large users to restrict their telephone equipment and to overload their line. Measured rates give low figures for moderate use, and so open the doors to vast numbers of small users, thus increasing the development of the telephone; they make the price of telephone lines and equipment cheap (as each call pays its way), and so encourage large users to take adequate telephone equipment, thereby greatly improving the service for every user of it. The large users get their calls at a gradually descending rate, so getting the benefit which it is usual in every business to allow the wholesale customer."

THE FARM TELEPHONE.

THE farm telephone has greatly modified the conditions under which the farmer works. This is recognized so generally by intelligent farmers that it is estimated that at the present time about two millions of farmers in the United States have telephones. The farm telephone has brought the farm into touch with the village and the city. What is equally important, the telephone has brought the farmers into touch with each other, says the Farmers' Review.

As a labor saving invention the telephone has almost no equal. It saves not only muscle, but mental effort. Before the days of telephones, the five million farmers in the United States made every year many unnecessary trips to town or to neighbors. It was not then possible to find out if a man the farmer wanted to see was at home. The only way for him to find out was to hitch up his horse and drive over to the place where the other man was supposed to be found. In case the man sought was not at home the trip had been made for nothing.

Happily those crude days are past and the man living in the country is in touch with multitudes of farmers in his own state and with thousands of farmers in other states, as well as in touch with the great cities. When the family doctor is required in a hurry, the physician is called up and starts at once for the place where he is wanted. If he is not at home he is "caught" by the telephone and sometimes found to be in the very neighborhood of the man that is calling him.

There are yet about three million farms in the United States where the farm telephone has not yet been installed. It will take some time for all of these to awake to a realization of the great value of the farm telephone and its little cost, but the change is going on. If a man will but stop to weigh the benefits against the cost of such a convenience, it is difficult to see how he can bring himself to go without what has now become a necessity in most of our city homes.

Scientific Research and Telephone Work

By Kempster B. Miller

SOMEONE in proposing a toast to Mathematics has said, "Here's to Mathematics! May it never be of any use to anybody!" It seems to me that there are some men, deep in scientific work, who perhaps unconsciously take this same attitude toward science. Is not this spirit incompatible with any altruistic view of the purposes of science? In order to be worth the doing should not scientific research develop truths which show ultimate utilitarian possibilities?

Kempster B. Miller.

The engineer takes from the great storehouse stocked by the scientist those truths which he can turn to practical account in his own work of providing the physical means of furthering human progress. Where the scientist has not done it for him, the engineer must often develop the truths for himself. As the engineer thus often reaches into the realm of pure science, so the scientist frequently works in the borderland of engineering. Essentially, however, one uncovers the truths of nature—the other uses them.

Lord Kelvin, who died but a few days ago, perhaps more than any man who has ever lived achieved preëminence in his work in both pure science and applied science. Since it is given to but few men to thus rise to the greatest heights in both of these lines, I think that the work of the world is being best done by these two classes of workers, the pure and the applied scientists, each staying in his own field rather religiously; but in view of the vast area of common interest in these fields and of the interdependence between the two, it is certain that each class may do its work better by each extending to the other a helping hand.

This little writing is in the nature of a plea for more and better scientific analysis and research work in telephony. The workers in the practice of telephony are in need of more light. While some splendid scientific work has been done, the fact remains that the methods employed in the advancement of telephony have been largely of the "cut and try" order. Things that have not been thoroughly understood have often been glossed over with inadequate explanations. Results have been secured, to be sure, but perhaps telephonists in particular and the world in general have looked on them with too much complacency.

Strange as it may seem at this late date, telephony offers some almost virgin fields for scientific research, the exploration of which in a truly scientific manner cannot fail to uncover truths which will be of great value.

One notable and recent example of what may be accomplished by the scientific and even academic method of attack, which stands out prominently in the history of telephony, is the work of Dr. M. I. Pupin of Columbia University. Dr. Pupin developed, by strictly mathematical means, a method of overcoming some of the deleterious effects of electrostatic capacity in telephone lines by interposing inductance coils of certain characteristics at stated intervals. The broad idea was not new, it had been thought of in a general way before, but it took Dr. Pupin and his mathematical analysis to make the idea successful. That it has been successful will be apparent when it is stated that by reason of it telephone conversation may be carried on at greater distances than before and over circuits that cost much less to construct. Dr. Pupin reaped not only the reward of public acclaim but, in a large measure, of money. Dr. Pupin and the scientists and engineers who have followed up his work have not exhausted the list of problems in telephony that mathematicians and physicists may solve. Much remains to be done in improving the characteristics of the telephone line.

As a basis of further work toward the betterment of telephone transmission, we should know more about voice currents and the effect on the ear of the vibrations which they produce. The problem therefore is not wholly one of electricity or physics—it is in large measure physiological. We hear much about the effects of the various frequencies on the quality of sound, but very little about the effect of varying the *phase relations* between these frequencies.

As a specific problem then, demanding the most careful and painstaking scientific investigation, I will suggest the study of the wave form of speech currents, and as a feat that is probably incidental to this I will mention the production of an oscillograph, the action of which shall not be hampered by inertia.

It is becoming more and more apparent that the modern telephone transmitter cannot retain its prestige in the light of physical analysis. It is believed that if the wave form of the telephone current which results from the action of the transmitter could be studied in detail it would be found to utterly fail in the "faithful reproduction of the sound waves" that tradition has attributed to it. Those who have studied telephone transmission know that part of the success in transmission is due not to the instruments or to the line, but to the adaptability of the human ear and mind. In other words, one does not hear all that he thinks he hears in a telephone, but the ear and the mind, taking the context as a guide, supply many deficiencies.

Telephonists feel pretty well satisfied with the receiver as a responding device. Perhaps, however, in the light of more complete knowledge, even this and the many other things used in the transmission system, to say nothing of the circuit arrangements, could be materially bettered in the light of greater knowledge of fundamental conditions.

As an example of one of the many other things that needs to be done in telephony, the partial or complete elimination of what is commonly termed "side-tone" in the receiver, may be cited. This requires an arrangement of the apparatus and circuits such that the telephone receiver at one station will be affected little or not at all by sounds striking the diaphragm of the transmitter at that station,

but will be affected in full degree by currents coming over the line from the distant station.

It is gratifying that the largest operating companies and some of the larger manufacturing companies are establishing well-equipped laboratories for the trying out and developing of new ideas. It is doubtful, however, whether in general these laboratories are getting at the bottom of things, so to speak, from the real scientific standpoint. It is perhaps not to be expected that laboratories maintained for strictly commercial purposes should do this to best advantage. Such work is more often done in our universities, and it is from them that much good could come if the proper interest could be aroused. I have heard prominent telephone engineers express the wish that the universities would give this matter serious attention, not with the idea of turning out ready made engineers, but rather for the purpose of advancing the scientific knowledge available on the subject of telephony.

Of course many false moves could be prevented and much unnecessary labor saved if the investigator, before undertaking the work, would post himself by thorough reading and by conferring with men interested in such problems who have not time or opportunity for working them out for themselves.

And finally let the scientist do some of these things primarily for the sake of doing them, not letting the possibility of monetary reward make him feel—as I think scientists sometimes do feel—that there is anything sordid or ignoble in the achievement.

KANSAS TELEPHONE CONVENTION.

THE Kansas State Independent Telephone Association held its annual convention at Topeka December 11 and 12, and the members present agreed that it was the most successful meeting ever held by the organization. Strong resolutions reaffirming the stand taken against any affiliation with the Bell and advising against Independent operators buying from Bell-controlled manufacturers and supply houses were adopted, the text of which will be found on the editorial page of this issue of TELEPHONY.

W. H. Nelson was re-elected president, making his third successive term. O. B. Clark, of Oskaloosa, was elected secretary and treasurer. Mr. Nelson and Mr. Clark were chosen delegates to the International convention which meets at Chicago January 21-23. J. M. Stratton of Clay Center, and E. M. Clark, of Pomona, were received as members of the association. Following are the committees appointed:

H. J. Campbell, C. L. Brown, Frank Dougherty, committee on system and bookkeeping; George M. Stratton, W. A. Campbell, J. C. Gurnea, committee on resolutions; W. H. Dilworth, M. G. Miller, Charles Henderson, committee on auditing; J. M. Doyle, J. E. Byers, C. E. Betts, committee on credentials.

Among those in attendance at the meeting were: W. H. Nelson, Smith Center, J. A. Zimmerman, Valley Falls, W. S. Twist, Bonner Springs, M. G. Miller, Olathe, Charles Morris, Holton, G. C. Dimm, Holton, A. J. Stevens, Hiawatha, C. E. Betts, Atchison, U. S. Hannum, Ottawa, C. B. Henderson, Alma, E. C. Undenstock, Osage City, Ernest M. Clark, Pomona, W. R. Pettyjohn, Hoyt, T. L. Dunlap, Monarch Telephone Manufacturing Company, Springfield, Mo.; J. C. Valentine, Effingham, A. H. Manning, McLouth, J. B. McClenny, Lyndon, C. C. Raymond, Greenburg, H. E. Baker, Overbrook, W. A. Campbell, Wichita, M. C. Wilson, Clay Center, F. W. Stine, Burlingame, John Erbacher, St. Marys, H. C. White, Waverly, F. B. MacKinnon, Tonganoxie, R. R. Blaine, Baldwin, Kans.; Fred Seeley, Chicago, Ill.; W. O. Rhode, Kansas City, Mo.; G. H. Miller, Wichita, Kans.; T. A. Pratt, Wakarusa, Kans.; H. L. Gary, Macon, Mo.; R. D. McGuffie, Waverly, Kans.; Ralph B. Montgomery, Burlingame, Kans.; John T. Miller, Clay Center, Kans.; B. C. Groh, American Conduit Company, Chicago, Ill.; R. R. Hinman, Kansas City, Mo.; Harry Carle, Burlingame, Kans.; L. G. Bowman, Dean Electric Company, Kansas City, Mo.; C. R. Brown, North Electric Company, Kansas City, Mo.; Fred Coulson, Dean Electric Company, Kansas City, Mo.; Harry Ziegerheim, Cameron, Mo.; James F. Barnett, Rutledge, Mo.; R. C. Houck, Standard Underground Cable Company, St. Louis, Mo.; G. E. Quigley, American Steel & Wire Company, Kansas City, Mo.; H. H. Yeager, St. Marys, Kans.; A. E. Troe, Topeka, Kans.; W. P. Hemphill, Topeka, Kans.; J. Myers, Kansas City, Mo.; J. E. Byers, Ottawa, Kans.; J. W. Berry, Jewell City, Kans.; J. C. Gurnea, Belleville, Kans.; H. L. Pierce, Belleville, Kans.; W. W. Dilworth, Beloit, Kans.; A. B. Clarke, Lawrence, Kans.; J. J. Clarke, Lawrence, Kans.; J. W. Harris, Hodge Electric Manufacturing Company, Kansas City, Mo.; George W. Watson, Kinsley, Kans.; J. W. Harbour, Overbrook, Kans.; J. E. Wright, Stromberg-Carlson Telephone Manufacturing Company, Kansas City, Mo.; R. L. Burns, Hutchinson, Kans.; J. M. Boatright, Harveyville, Kans.; F. H. Clarke, Herington, Kans.; George E. Spiller, Emmett, Kans.; J. H. Close, North Electric Company, Howard, Kans.; Ben. C. Hyde, Stromberg-Carlson Telephone Manufacturing Company, Kansas City, Mo.; H. B. Hewitt, L. M. Ericsson Telephone Company, Buffalo, N. Y.; A. A. Goddard, Topeka, Kans.; B. H. Pankey, Topeka, Kans.; W. M. Sipes, St. Marys, Kans.; R. H. Drake, B.-R. Electric Company, Kansas City, Mo.; R. E. Mattison, Lincoln, Nebr.; W. H. Canan, Beatrice, Nebr.; L. E. Hurtz, Lincoln, Nebr.; R. H. Shove, Winchester, Kans.; P. J. Eubanks, Automatic Electric Company, Chicago, Ill.; C. A. Shinn, Randall, Kans.; C. H. Wallis, Central Telephone & Electric Company, St. Louis, Mo.; Theodore Gary, President International Independent Telephone Association, Macon, Mo.; W. S. Massey, Grantville, Kans.; W. Moxley, Nortonville, Kans.; W. J. Crawford, John A. Roebling Company, Kansas City, Mo.

NEBRASKA TELEPHONE CONVENTION.

THE annual convention of the Nebraska Independent Telephone Association will be held at Lincoln, Nebraska, January 15th, 16th and 17th. The meeting will be held at the Lindell hotel and elaborate plans have been made to make it a banner event in the history of the Nebraska organization. Mayor F. W. Brown will welcome the visitors on behalf of the city of Lincoln, at the opening session, which begins at 2 o'clock p. m., January 15. After the reports of officers and committees, Henry T. Clark, state railroad commissioner, will give an address on "The Application of the State Railway Law to Telephone Companies," and the following papers will be read: "Toll Line Methods and Development in Missouri and Kansas," C. J. Myers, superintendent Kansas City Long Distance Telephone Company; "Advertising and Publicity," W. J. Stadelman, Norfolk, Nebraska; "Benefits of Organization," W. T. Barnett Macon, Missouri; "Toll Line Equipment," S. A. Hensley, Lincoln, Nebraska.

Five states will be represented at the convention—Nebraska, Iowa, Kansas, Missouri and South Dakota,—and more than a score of telephone manufacturers have reserved space for exhibits. At noon, January 17th, the convention as a body will go to Omaha to inspect the Independent exchange now operating at that place. A special train has been provided for the occasion.

The Nebraska association has issued a handsome folder relating to the convention, which is an earnest that no pains will be spared to make the meeting a success.

Hello Girl—"Well, here is a gentleman who wishes to speak with you."

Voice From the Telephone—"Oh, my! Wait a minute—I'm not dressed yet!"

THE IDEAL ASSOCIATION

Its Present Achievements and a Prediction Made in an Article in the December 1903 Telephony

By Edward E. Clement

I HAVE again been asked to take up the subject of organization of the Independent telephone interests, and add something to my views formerly expressed. Of course, this important subject can not be properly treated in a few words, hence I will only attempt to give a general idea of what has been accomplished since the article which follows this was written, in December, 1903, which I submit proves the correctness of my former theories.

Since 1903 we have seen the International Independent Telephone Association grow from a loose aggregation to a great representative organization reaching into practically every state in the Union, and finally expanding so as to cover our sister country on the north, where a similar fight is being waged to that carried on in this country. The growth and expansion of the organization may be dated from 1904, when apparently the large operating interests became convinced of the wisdom of themselves organizing and as far as possible supporting a representative national body. At the St. Louis convention of that year the so-called Ohio plan of representation was presented by James B. Hoge of Ohio, and after discussion was approved, and steps were taken to reorganize the association on a representative basis. In October of that year the first state swung into line when the Pennsylvania association formally accepted and ratified the national plan, and elected delegates to the national body.

It became apparent that in order to satisfactorily complete the work thus auspiciously begun, the Interstate association and the National association must be united, and in January, 1905, through the efforts of Theodore Gary and James B. Hoge, the respective presidents, assisted by a number of other prominent telephone men, a final union was effected. This was unanimously ratified and approved at a joint convention held in June, 1905, in Chicago, when Mr. Hoge was elected president and Mr. Gary first vice-president. These two gentlemen remained in the office designated for two years, and during that period the most vigorous efforts were made, uniformly successful, to organize all the important states. Co-operation was obtained among individual operating interests from the Atlantic to the Pacific and from Canada to Mexico.

At the Chicago convention in June, 1906, another long step forward was taken when the name of the association and its bylaws were changed to include the entire North American continent, and in September the International Independent Telephone Association officers assisted in organizing the Canadian Independent Telephone Association at Toronto, from which delegates were sent to the International body.

In June, 1907, Mr. Hoge retired and Mr. Gary became president of the International association. The present condition and standing of the association under his able leadership are too well known to the readers of TELEPHONY to need more than passing reference on my part. The detailed figures showing the strength of the association and the extent of its ramifications will all be presented in the reports of the officers at the January convention, and I am happy to say that they fully justify our faith through years of darkness, which was indeed the evidence of things hoped for but as yet not seen.

The following article by Mr. Clement was published in TELEPHONY in December, 1903:

THE IDEAL INDEPENDENT TELEPHONE ASSOCIATION.

I have been asked to write upon the subject of organization among Independent telephone men. Compliance with this request by anyone must involve careful thought, not only on account of the serious problems presented, but because they have been and are being considered by some of the ablest minds. In common with most men who have watched the development of a gigantic industry from small beginnings within the past decade, I believe the same forces that have proved so potent hitherto, by what Max O'Rell termed the "sheer brute force of intellect," will solve these problems ultimately. In the meantime, I feel that developments which in their very nature are dependent upon the operation of economic laws cannot be forced. The telephone industry is affected by the same laws as any other, and the men engaged in it are neither better nor worse, neither more disinterested nor more selfish than their fellows in general. Competition is the life of trade, and as Mr. Dooley puts it "men must earn their money by scraping it off each other with a file." Any scheme of organization that aims to eliminate human nature and create angels for a special purpose must fail. The practical thing to do is to determine how the forces now in existence can best be directed to further the common interest without depleting themselves and without destroying the individual initiative which is at once the sure creator of healthy business conditions and the best guaranty of their continuance. American business men of all classes are rightfully jealous of the control by each of his own business, and telephone men particularly have never been remarkable for their lack of self-assertion.

There are three distinct classes of men engaged "in or about" the Independent telephone business in this country. First of these are the manufacturers, in which class I include not only those whose money is invested, but those whose brains direct. To these men, and particularly to the second class of them, belongs the major part of the credit for having built up the Independent business, and a number of them who are now in the capitalists' class have created their capital out of the business as they built it up. Second are the operators, including also capitalists and the active men of brains, many of whom are both. The third class comprises professional men, lawyers, engineers, journalists and others, whose employment grows out of the operations of the other two classes.

Of these three classes of men, certain motives and certain modes of action can be predicated with reasonable certainty.

The manufacturer is in business to make and sell goods at a profit. He constantly risks his accumulated stock, comprising money and goods, in his ventures; and his efforts will constantly be directed to two main ends, viz., to keep down the cost of production, and to increase the value of his output. The first end can be attained either by cheapening his processes of manufacture or simplifying the character of his goods or both; and the second by enlarging his market, forcing his sales, or selling at high prices. Competition compels him to maintain the standard of excellence in any case.

The operator seeks to install his plant as cheaply and to maintain it as economically as possible. As against his desire for a low first cost, he is forced to adhere to a car-

tain standard of excellency by two considerations: first, the necessity for satisfying the public, upon whom he depends; and second the necessity for keeping down operating expenses and the cost of maintenance. Many an operating concern in the Independent field has learned the lesson by bitter experience that a penny saved in the beginning is often a dollar lost in the long run.

The third class, theoretically speaking, ought to be the happiest, but experience does not justify the theory. While they are not directly subject to the specific trials and risks of either manufacturer or operator, they have troubles of their own. The technical newspaper man in particular must have quite as much tact as his non-technical brethren if he would satisfy, and not imperil either his advertising or his circulation. For obvious reasons he must cater somewhat to the manufacturers, and must also have constantly in mind the advantage of his subscribers. His principal function being to act as a medium of communication, he must retain general confidence, and to do this he must be reliable. This, I believe, most newspaper men endeavor to be, in spite of the small credit they get for it.

Having thus briefly reviewed the personnel of the business, there are two questions to be asked—and answered. Can these classes be amalgamated on any kind of a reasonable basis to form a harmonious if not a homogeneous organization? If they can be, what benefits will result?

The second question must be answered first. There are a number of most important ends that may be attained by the organization of a strong, permanent association. Assuming that it is actively supported, here are some of the things it can do:

It can help the manufacturer:

As each individual manufacturer endeavors to keep down his cost and increase his sales he will make improvements in the factory and he will resort to all sorts of methods to move his product. In improving and cheapening his designs the association can save him money and give him security by furnishing his counsel and engineers with information otherwise obtainable only at considerable cost. If in the progress of events disagreements arise or infringement is alleged, the association can save both parties time and money, and the Independents at large injurious scandal, by arbitration, cases being presented by counsel if desired. In widening his market the association can help him with information in detail concerning men or companies, plants or franchises. It can help him against unfair competition, for example by insuring that a purchasing agent who accepts a bribe, if discovered and reported, will be permanently out of a job, and will be properly advertised beside, through official channels. It can help him against any other manufacturer who violates commercial decency and fairness by deliberate infringement, misrepresentation, or the like (if after due presentation of proofs the governing body is satisfied as to the offense). It can help him by keeping him in touch with its members without forcing him to sacrifice his self-respect and squander his profits in so doing.

It can help the operator and investor:

By hammering it into the public that fair rates are essential to good service, and that the larger the exchange the higher the cost per line of installation and maintenance.

It can help raise the dignity and standing of the business generally, and wipe out the recollection of early wild-cat days.

It can show the legitimate investor where and how it pays to put in a good plant in the first instance, and it can hold up the fly speculator who builds cheaply for purposes of sale only.

It can protect the investor as well as the builder in many other ways, as by furnishing reliable data, and by compelling (if persuading is impossible) companies generally to keep up to a certain standard of plant and service. It can act as a national clearing house, with local branch clearing houses, for the interchange of information and of values. It can give impartial and unbiased opinions as to questions of possible patent infringement and of engineering, these preferably through the counsel or engineers of companies.

It can help the lawyers, engineers and journalists:

By co-operating with them in all their efforts for individual clients or for the field at large, so far as an impartial agency can do so. Any of these men can think of a dozen ways in which an association bureau could help him, without in the slightest invading his prerogatives. For example, in furnishing assistance in defending suits affecting members. Such assistance would likely be limited to information, but it would be valuable at that, and it might extend to financial aid, as it has heretofore (by the backing of manufacturers).

No great movement ever succeeded through sporadic efforts. The German army was victorious in the war of 1870, not because of separate battles won at different points, but because of intelligent co-operation directed from a common point, and also because of complete detailed information of every part of the country it was destined to overrun. The press clipping bureaus, and the telephone journals give efficient service, it is true, in a way, but that service is intended principally to further the sale of goods, and it by no means meets the needs of the financier or investor.

The first question asked remains to be answered. Can the classes be amalgamated properly? The answer is this—they can if the proper methods are adopted. They cannot be properly amalgamated by mixing up generally in an annual meeting, expecting one class alone to spend all the money and do all the entertaining as well as guarantee all the legitimate expenses of the crowd. This has been a crying injustice to the manufacturers, and the good men and strong men among the operators know it. It is wrong for another reason, that it does the operators injustice. If the members of one class pay all the expenses of any institution they are entitled to regard it as a thing for their own principal use and behoof and may treat it accordingly. It is scarcely necessary to say that no association of this character will ever be truly representative or command general respect if controlled by one class only.

Having said this much, I will endeavor to sketch out a practicable scheme for such an organization as would really be representative, dignified, useful, impartial, and in fact what the Independent Telephone Association, by whatever name it is known, ought to be. At the outset I will lay down some few rules as to what the association must not be and must not do, which will help in determining what it must be and must do:

(1) It must not exist without clear and definite purposes.

(2) It must not be a thing without real power and authority for its purposes.

(3) It must not be controlled by or limited to any one of the three classes of men in the business, only.

(4) It must not interfere for or against any manufacturer in his business.

(5) It must not attempt to control or dictate to any operating concern in matters affecting itself alone, nor in any matters without a local connection and accurate information as to local conditions.

(6) It must not be made an appendage to existing commercial bodies, nor take any part in commercial business.

(7) It must not be dependent upon voluntary subscriptions or charity for its maintenance.

A scrutiny of the above negatives will enable us to formulate at once a number of important positives. Taking the negatives in order, I will take up the positives in the same order.

The organization must have purposes beneficial to all

engaged in the business, and these not sentimental purposes, but immediately useful from a business standpoint. I will not go into all these that might be mentioned, but will content myself with referring to a few:

Provision should be made for the collection of accurate statistics from all parts of the Independent field, and of all other fields that might furnish valuable data. These statistics need not be made public, but would be of immense value to members of the association, and should be controlled by the governing body. They would be invaluable in financing, and could also be taken as the basis for taxation. They should be furnished by local bodies on forms provided by the central body, and should be kept up to date by a regular system of reports on similar forms through the same channels at stated intervals.

Provision should be made for systematically educating the public and strengthening the market for securities by the dissemination of accurate information. Encouragement and assistance should be given to and in the exchange or passing of securities, by the finance committee or other body, serving merely as a bureau of intermediation between parties, and not itself as a party to transactions for profit.

Provision should be made for assisting in standardizing construction work and the general types of apparatus employed, without interfering with the freedom of selection of specific makes of goods. A system of special reports to members might well be adopted, similar to those of the National Underwriters' Association.

Provision should be made for the systematic collection and use of information on patents. Such information would also be under the control of the governing body, and could best be handled by a disinterested and impartial expert retained by the governing body, who would be a valuable auxiliary to counsel and experts retained by manufacturers or others to prosecute or defend suits.

In connection with the patent bureau, provision should be made for all disputes arising under patents or supposed cases of infringement to be submitted, for arbitration and settlement if possible out of court. The importance of having an absolutely confidential bureau for this purpose, under the control of the governing body and directed by an absolutely impartial and disinterested trained expert, will be apparent. Cases might well arise where only one party was a member of the association, and yet the official submission to the association bureau would prevent a suit. With the constant multiplication of patents, large numbers being taken out by the various Independent manufacturers, as well as by the Bell company, litigation among the "Independents" themselves is almost inevitable, but should be avoided if possible for two reasons, first, because of its bad effect upon investors, and second, for the sake of economy.

Provision might be made for a general board of arbitration, composed of members from the different districts or states; and to this board many questions in dispute might be referred for settlement.

Provision should be made for meetings at stated intervals, at which, as at present, the necessary elections of officers, rendition of reports, and the reading and discussion of papers, should be had. These, with the usual features of social intercourse, exhibits by the manufacturers, and the incidental visiting of points of interest at meeting places, have of course characterized the existing bodies. They are indispensable for any association, but obviously they do not fulfill all the required conditions. The proceedings at these meetings are reported at some length in the telephone journals; but in a thoroughly organized association all matters of permanent value, such as reports of committees, and the like, should also be officially communicated to each member, in such form that a complete file of the association publications and reports could be kept together for reference.

To be permanent and continuously useful, the association must have power, and the exercise of its power must naturally be entrusted to its officers and governing bodies. In accordance with the general underlying principles of all similar institutions such officers and governing bodies to be really efficient must be truly representative. This follows also from a consideration of the second and third negatives we have laid down. But the difficulties in the way of selecting representatives to a single central body of manageable size where the individual membership is as diverse and widely scattered as it must be in the Independent telephone business throughout this country, are apparent at a glance. It follows that state or district bodies must first be organized, somewhat after the fashion of the state legislatures, these in turn to send their chosen representatives to the central body. Other reasons besides the difficulty of organization would appear to dictate this policy. In all organizations the collection of membership dues and the handling of finances from a distance are difficult. The proper collection of statistics and handling of reports from a distance are equally difficult. For such purposes local organizations are almost indispensable. It should also be noted that in assisting, controlling, and within limits directing the methods and operation of members, it is indispensable to be in direct touch therewith. The fifth negative touches on this point.

Suppose the entire country to be districted in any convenient manner, as by states and groups of states, each district being determined by the approximate possible amount of taxation. Let each district then have its governing body composed of representatives from the individuals and companies therein, the amount of representation or the number of representatives being determined in proportion to the tax paid in any case. Each district body should select its own officers and should work under its own constitution and by-laws. The ultimate development of such organization would of course be the incorporation of each district body, whereby it would gain the power to enter into and enforce contracts for purposes within the scope of its charter, while the liabilities of individual members would be strictly limited. A number of incidental advantages would flow from such incorporation, such as the power to hold and transfer securities, and the like.

The district bodies, according to this scheme, would elect the delegates to the national body, exactly as the state legislatures now send their representatives to the United States senate.

A difference would have to be observed, however, in this, that the number of delegates from any district to the national senate would be determined by the number of members in the district body, that is to say by the taxation in the district. This national senate might also be duly incorporated, its shares being held by the district bodies, as its income would be derived from the district bodies, amount of tax in each case being determined by the number of delegates, that is to say by the membership or national tax roll of the district.

Some such organization as this which I have briefly outlined will undoubtedly come about in the near future, by natural evolution, unless some enterprising group of capitalists succeed in obtaining control of the important centers and ultimately organize a single overlying company on the plan of the American Bell. At the present writing, this contingency does not seem likely to occur, and its advent would naturally be resisted by most of the manufacturers, for any consolidation of the operating interests of the country must inevitably be accompanied or followed by the manufacturing of their own equipments. Such a trust might take in some of the large manufacturers, but not all. Another strong reason against the present formation of any trust arises out of the possibility of radical changes in central office equipments in the near future. The work of rebuilding thousands of the existing changes, whether with automatic or up-to-date manual apparatus, can best be

done by individual companies under the auspices of a strong national association.

The district governing bodies to which I have referred would naturally have exclusive jurisdiction in all matters arising within their own districts, the national senate would have jurisdiction in all matters affecting more than one district, and in matters arising between district governing-bodies; and in general it would be a national clearing house for the convenience of individual members throughout the country. Its revenues should be sufficient to cover routine expenses, such as the gathering and arrangement of statistics, printing, correspondence and patent work. A certain amount of expert work would be required, as in the preparation of special reports to members, and the like, and for this, a charge should be made. All special expenses, such as those incident to patent arbitration, should be met by taxing the costs on the parties to the controversy; and these need not be heavy.

So far it might seem that the plan would apply to operating concerns alone. This is not so, however. The scheme of taxation could easily be so arranged as to permit the entry of a manufacturer into any district, and his sending a delegate or delegates to the district body, in number proportional to the amount of tax which he is willing or is permitted to pay. Another plan would be to form a separate artificial district for the manufacturers, who would thus have their own local governing body, possessed of great power and influence, as it should be, fully competent to deal with difficulties arising between it own members if it so desire. and able to certify them to the national senate for decision there if desired. This manufacturers' district body or union (!) would of course send its own delegates to the national senate, and a very salient advantage in having the manufacturers thus primarily associated together would be that no one concern could gain a real or fancied advantage over the others by making subscriptions which they would have to cover or be damaged in the eyes of the operating people.

It remains to consider the relation of the third class of men to this association. It would be two-fold. Membership would be open to professional men and journalists upon payment of such per capita tax as might be fixed by their nearest district bodies, but the scheme would not contemplate membership of these men as a rule. Their usefulness would not depend upon membership in this association, nor would their business relations be affected by it. The lawyer or engineer is retained by the individual manufacturer or operating company; while the technical journal is a medium of communication, and would be recognized as such and treated accordingly by the national senate as well as the district bodies, without membership. In this connection it should be noted that at present there are several technical journals in this field. If there were but one, that one would naturally be the official organ of the entire association. Under the present plan, there would be nothing to prevent the district bodies from selecting official organs if they so desired, and one or more of the district bodies might thus be served by each of the journals referred to. The national senate, however, should be independent, and should have no organ except its own official publications.

It is scarcely necessary for me to go into detail as to the business organization of any of the governing bodies. I will say, however, that the office of the secretary of the national senate, under this plan, would not only be a busy place, but would require a man of special training and ability to run it. The patent and other bureaus should be under his direct charge, to insure the proper care of all records, and it is not too much to say that with these statistics and the information regarding patents, etc., that would accumulate in a comparatively short space of time, these records would be of immense value to all the members of the association.

The benefits derivable from such an organization by everyone in the field, seem apparent. All the advantages of acquaintance, mutual support in patent suits, etc., that have flowed from previous associations, would be preserved and increased. The mere existence of statistical reports would operate as a check on unscrupulous local organizers, and the information gathered would be invaluable to the manufacturers as well as to investors and operators. The adoption of a general standard for construction work would be furthered, and impartial expert information in the shape of special reports, which could not otherwise be obtained without considerable expense, would be obtainable by every member of the association, be he big or be he little. If the system of arbitration of differences, whether arising from infringement of patents or otherwise, should be generally adopted or should be made compulsory before resorting to the courts, a sense of security would be created; for such action within the Independent ranks would argue well for united resistance to attack from without. In the event of such attack, which is not uncommon now, and which will probably be more common in the future, counsel and experts for members would find a welcome, reliable and economical source of information and assistance in the national bureau. For any of these purposes, however, and particularly for arbitration, the bureau, to be of value, must be above the suspicion of partiality.

In closing, I wish to say that while the ideas advanced in this essay are my own, they have met with the approval of many representative operating and manufacturing men to whom I have broached them. I believe that a structure to be substantial must be built from the bottom up, not from the top down. If the strong men in the operating concerns take hold of the matter in earnest, it will be brought about, and that action can be greatly facilitated and accelerated by what happens this next month in Chicago. A call for state organizations to send in national delegates would meet with a fair response if understood, and kept before the people. Once started, the organization would be self-perpetuating.

In the near future some scheme of selection will be indispensable. In the past the representative men have naturally come to the national councils: but in the future. if a man is not big enough at home to sit in his district, he ought not to be boosted into a national council. To acquire and retain confidence, selection is imperative.

There are four thousand telephone patents issued in this country. There are three or four times that many Independent exchanges in existence. If the telephone people want to know what they are doing they should be served by an organization that works all the time, not once a year, that works steadily and quietly, not making one great hurrah and then going home.

ABOUT "HELLO" GIRLS.

ON Saturday afternoon at Main office, Miss Moon "got" a subscriber who had thrown his fury into the third speed," says the Chicago Operating Bulletin.

At first he was unwilling to talk. He wanted some one higher in authority. Miss Moon explained that he could reach no higher on Saturday afternoon.

"Well, who are you?"

She told him she was the assistant chief operator.

"But what is your name?"

She told him she was Miss Moon.

He paused, almost reminiscently.

"Moon—Moon—Moon," he repeated, in a musical cadence. "Well, I guess that's high enough for me."

The Toledo Blade is responsible for this one:

Lady (formerly an operator)—"Porter, why didn't you call me as I instructed you?"

Sleeping Car Porter—"I did, ma'am; sho's yo' bo'n, I did. I sade, 'Seven-thirty ma'am,' an yo' sade, 'Line's outa ohder.'"

Wireless Telephony in the Navy

By N. J. Quirk

The Ships of the Atlantic Fleet En Route to the Pacific are all Equipped with Wireless Telephone Apparatus

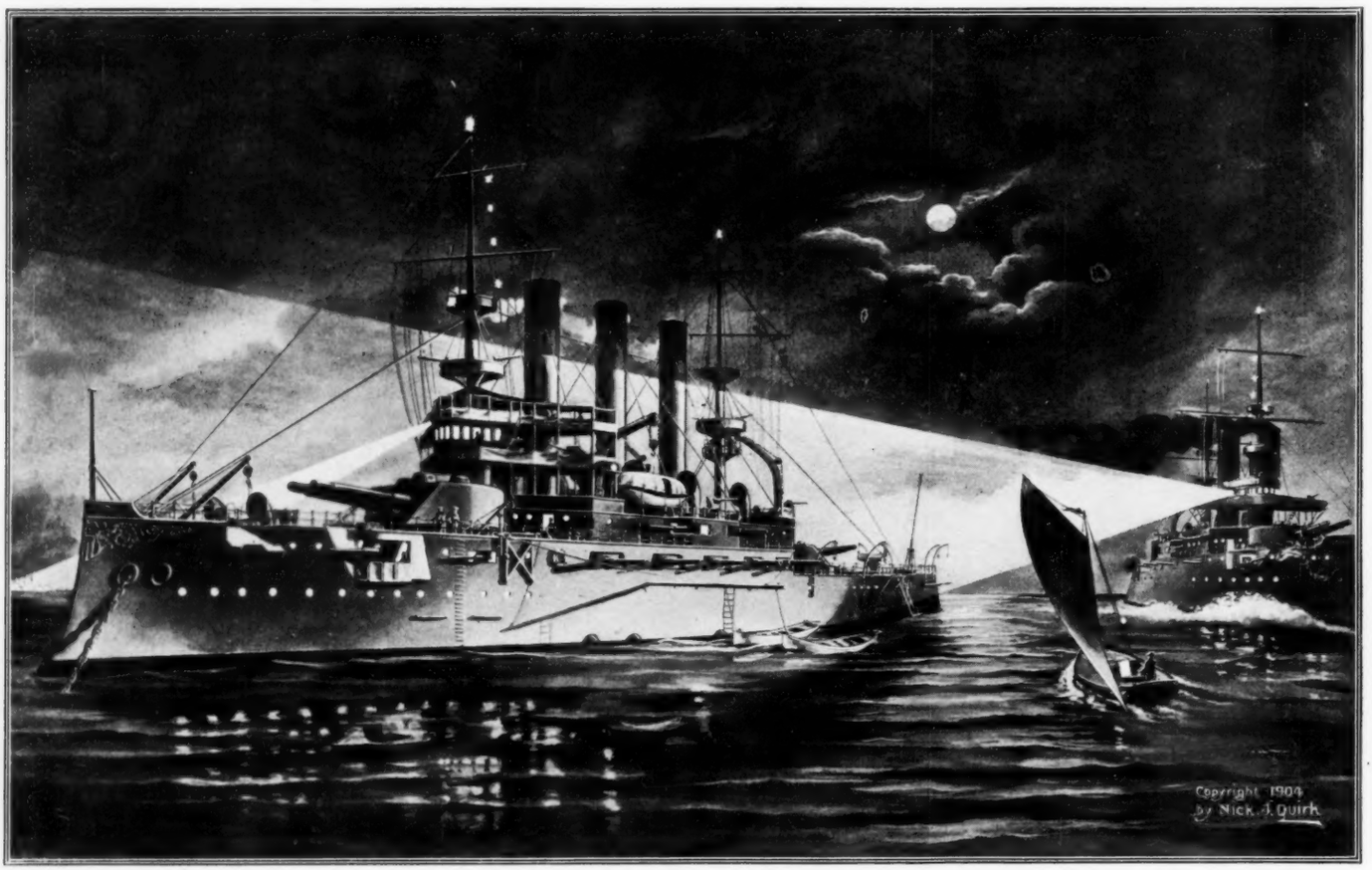
OF ALL innovations making for economy and utility at sea, the latest and perhaps the greatest, is the wireless telephone system now installed aboard the sixteen battleships and six torpedo boat destroyers representing the fighting strength of the most powerful fleet of warships ever sent on a long cruise under one flag. Five other ships accompanying the fleet will be similarly equipped.

This assemblage of modern warships is the last word that mechanical genius, naval construction and cash payments can say in modern marine progress and is the most complex example of science and skill the mind of man has conceived; for between masthead trucks and cellular bottoms, almost every art and trade is represented. Electricity in its various branches is a dominant keynote in its creation, for like modern buildings, a battleship must be lighted and cared for and her crew of 800 men made as comfortable as possible, largely by the use of electrical equipment, which now discharges duties formerly done by manual labor, steam or hydraulic power.

The plan may be likened to that of a trolley line with separate motors for special work conveniently replacing many subsidiary engines, thereby keeping the steam where it belongs—in boiler and engine rooms—and exercising a wide range of service such as hoisting anchors, lowering boats, turning the great gun turrets or furnishing the current for various methods of communication between ships, and from ship to shore.

Two of these systems, the "Ardois" night signals (a string of four lanterns from the mast-head half way down to the bridge, and using colors, dots, and dashes in combination) and the wireless telegraphic system, communicate their messages by an adaptation of the familiar Morse code, and for obvious reasons, are subject to the danger of failure when most desperately required—during the stress and shock of actual battle. The third and probably the most efficient system for such crucial test is the newly adopted wireless telephone, which had its first baptism by fire during the battle of Mukden when the victorious Japanese commander directed the movements of his entire force from his central twelve miles in the rear of the fighting line.

The difficulties encountered heretofore in marine communication has been heightened by fog, breakdowns and lack



Battleship Maine, under searchlight of Battleship Illinois, both vessels are equipped with wireless telephone apparatus.

of proper pitch, but now for the first time in history a great fleet of ships, sometimes five or ten miles apart, steaming through stormy seas in darkness and without visual knowledge, are in constant communication with each other without overhead wires or submarine cables to restrict conversation, which can be carried on almost as easily as if done between rooms in a great hotel. No dot, dash, dot or click, clickty-click business about it to confuse or misconstrue, but simply a strong hearty "Hello, say Bill" style of delivering the admiral's orders, compliments, and other messages perhaps not so pleasant when fault is to be found.

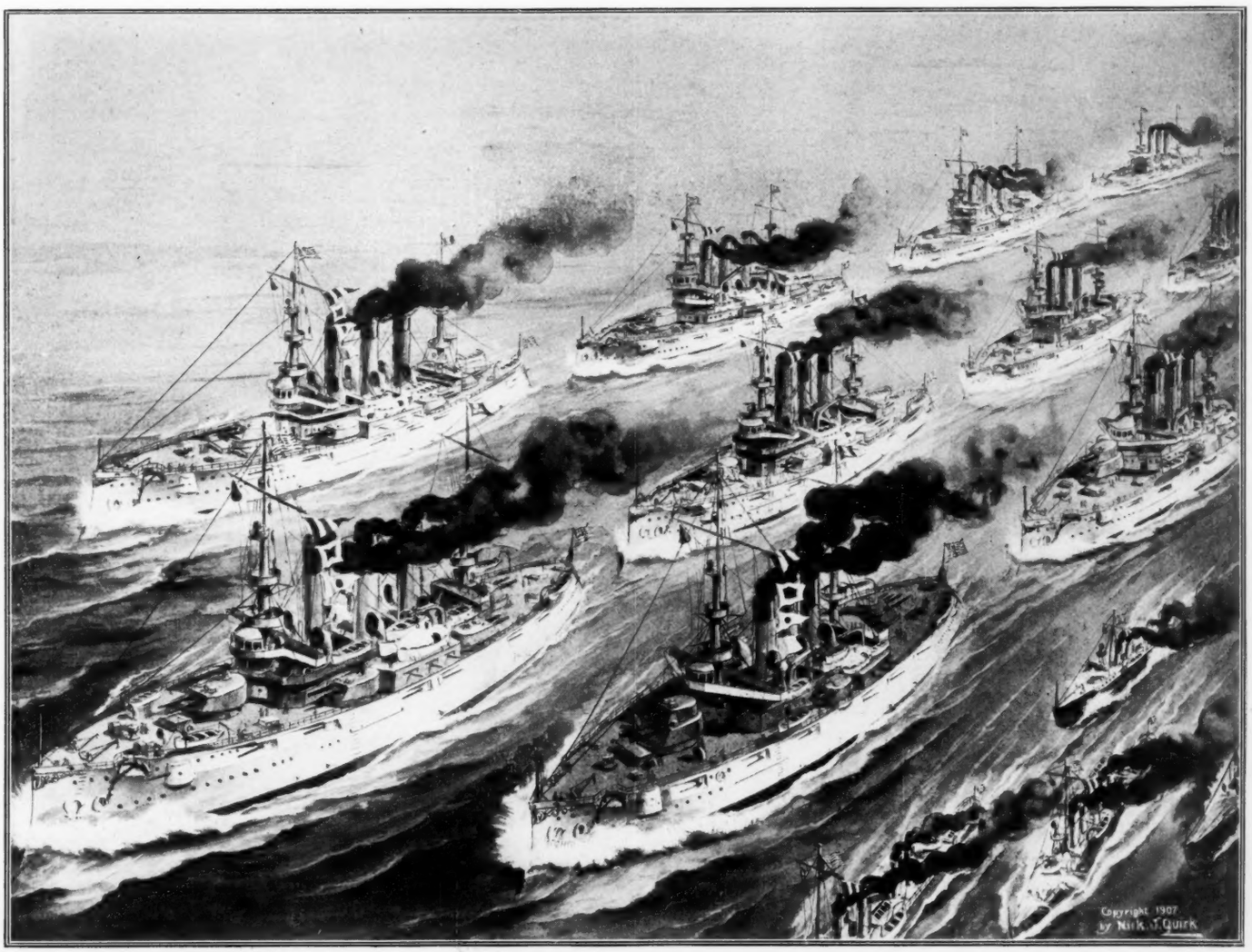
Admiral Evans' responsibility to the government in safely handling this fleet is very great, for at best it is difficult to control and guide even a small squadron from the Atlantic to the Pacific, but this new development in science will save much worry and solve many problems which might delay or endanger the ships. By the telephone system he can not only transmit orders from ship to ship, but communicate with the shore as well, since it is successfully worked in connection with land wireless telegraph stations.

This achievement has been the dream of naval strategists for many years, as it is of supreme importance to secure and maintain a positive method of communication between the commander-in-chief and his fleet captains—a possession of greatest value in war, of course, but scarcely less during peace maneuvers. This has been realized by the United States government in a series of official tests carried on at Hampton Roads while the Jamestown Exposition was open and during the practice cruising and gun practice off the New England coast last spring.

The superposed turret ship Virginia and flagship Connecticut were two of the first large vessels to receive the new telephone equipment, and between them a naval board of officers tested it so thoroughly at Norfolk and Cape Cod that its practical value over other methods of communication was conclusively proven.

The ordinary means of daylight communication is by arranging colored flags, whose relation to each other spells a message, or "wigwagging." This is done by an athletic apprentice, who, under an officer's direction, swings a flag in various directions somewhat as members of a train crew signal each other by waving their arms. At night, the "Ardois" or colored lanterns are used in the same manner that a series of flags are hoisted in daylight, but each and all of these methods are useless in thick and foggy weather, when the flags could not be seen at all or the rays of light pierce the gloom of smoke and darkness. This, then, is the time when the wireless is appreciated, for the admiral from his cabin can locate and call to the receiver the officer commanding any vessel in the fleet, transmitting with ease any general order or special message with absolute certainty.

The service is guaranteed for five miles talking distance—the official tests have credited it with eleven miles, and



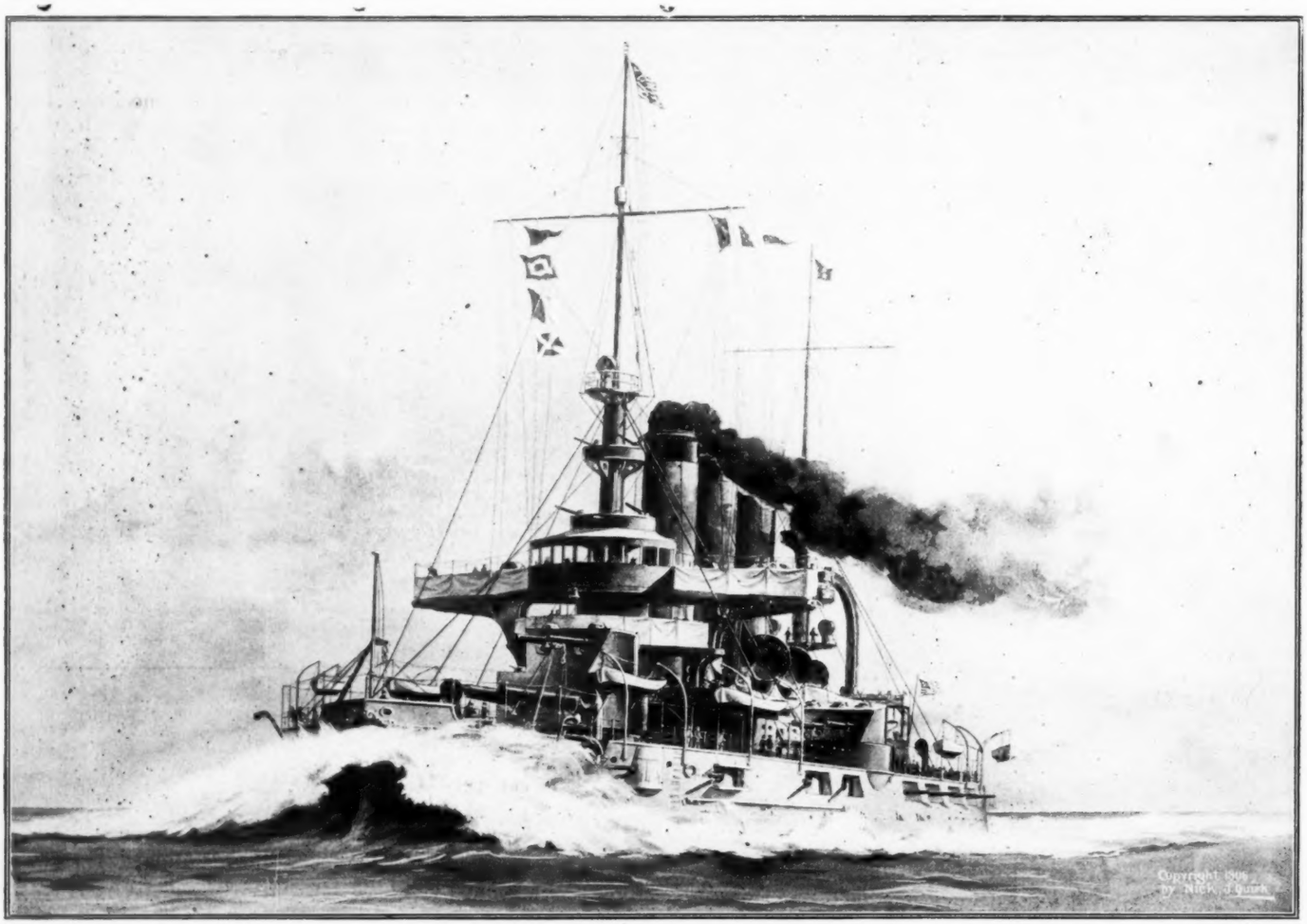
Vanguard of Atlantic fleet en route to the Pacific, Admiral Robley D. Evans, U. S. N., commanding. First column—Battleships Georgia and Virginia; second column, Connecticut (flagship), Louisiana, Kansas and Vermont; third column, Minnesota, Ohio, Maine and Missouri Foreground—Torpedo boat destroyers Hopkins, Hall, Stewart and Whipple, all equipped with wireless telephone apparatus.

twenty-five have been recorded between a merchant vessel and battleship.

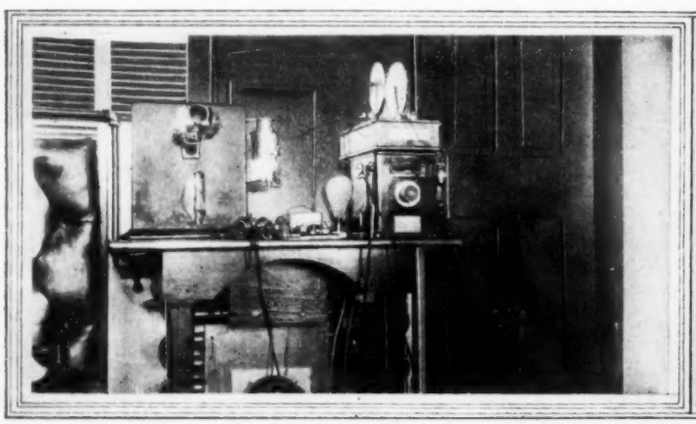
Wireless telephony is now fairly well understood, since it is common knowledge that the human voice like all other sounds, causes atmospheric waves to radiate into space and quiver along aerial wires. While these waves are produced and transmitted like those of wireless telegraphy, they are interrupted and received in an entirely different manner. This is shown by the interesting fact that some ships equipped with wireless telegraph can hear the sound of the wireless telephone from another vessel, but none can respond by voice.

The instruments themselves look simple enough because of their compact business-like appearance, but they are the result of years of experiment in bringing them to a state of efficiency which the United States Navy Department exacts.

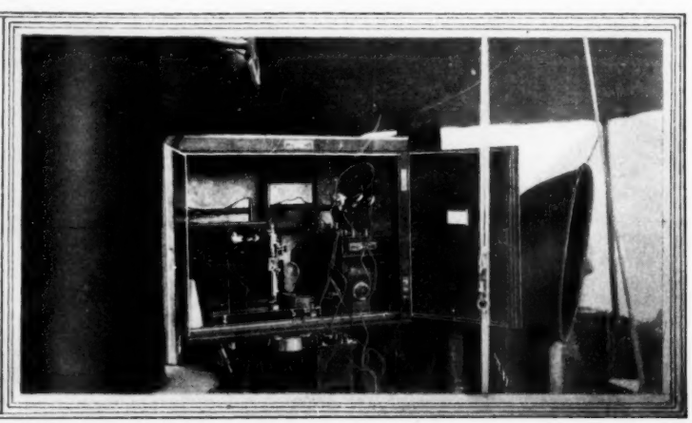
The accompanying pen and ink sketch shows the first wireless telephone for the navy, just now located in Admiral Evans' emergency cabin aft on the Connecticut, and shows one of his staff signal officers sending to a five-mile-distant vessel, as will constantly be done during the cruise en route to the Pacific. To the right is the delicate receiving box, with the tuning device on top. In the center is a telegraph key, resembling the ordinary buzzer, which, by simply cutting out the microphone with a switch in front of



United States superposed turret ship Virginia, 15,320 tons, 66 guns. The first warship to use wireless telephone apparatus.

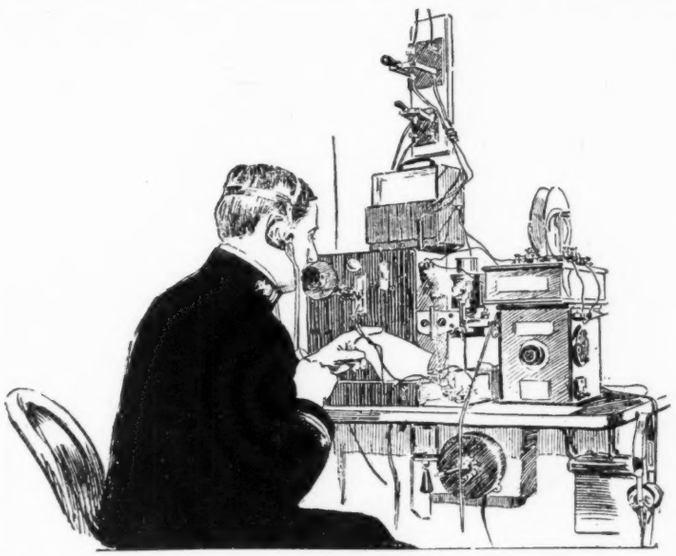


DeForest wireless telephone apparatus installed on U. S. battleship Virginia.



DeForest Radio telephone apparatus in the weather proof "hood" installed on bridge of U. S. torpedo boat destroyer Truxton.

its face, enables the apparatus to be used for wireless telegraphy, sending the ordinary Morse signals. The transmitter is shown at the left, with a projecting mouthpiece. One



"Central" on the flagship—Lieutenant Weaver of Admiral Evans' staff acting at "Hello" man on the Connecticut.

of the features of this is a nickel arc or oscillator, with an alcohol lamp beneath. This indicates when the proper oscillation or voice waves emitted from the aerial wire takes place and causes a small incandescent pilot lamp to glow, shown at the top of the transmitter box, when talking can be carried on. Increasing the range for talking is now going on by experiments, and 100 miles or more may be reached in the near future. Besides speech, whistling, singing, gramophone and orchestra music can be plainly heard and reproduced five or ten miles away.

This is an unalloyed pleasure to the boys in blue, for besides being wireless, the system is girlless—no hello girls needed in connection with the new installation. Just how the various ships are to be picked up in the wireless telephone operations, or in what manner the usual land exchange will be eliminated, are problems which the naval officers are not explaining for publication. They declare, however, that no difficulty has yet been experienced in this regard. Even if the wireless telephones cannot be used as freely in the interchange of messages on sea as are land telephones, they will prove very useful in the navy. Even if only two ships in the same vicinity could communicate at the same time, the field of usefulness of the inventiton is practically unlimited. Naval officers believe their scope will be much more extended. It does not take long to install the instruments which can be easily attached to any vessel.

The apparatus used aboard the fleet is manufactured by the Radio Telephone Company of New York. One of the interesting exhibits planned for the coming electrical show will be a miniature battleship fully equipped with the Radio company's apparatus.

STANDARDIZATION POSSIBILITIES

A Brief Discussion of This Important Phase of Practical Telephony

By H. P. Clausen

A CAREFUL student of the developments which have taken place in the design, construction, and use of telephone apparatus ever since the earliest days of telephone practice, and particularly prior to 1894, becomes thoroughly convinced that in all of the articles produced an underlying tendency is observed toward maintaining a certain standard, whether it be in the line of apparatus, the principle of design, or the manner in which certain pieces of apparatus are being used.

For the fourteen or fifteen years of absolute control of the production of telephone apparatus in large quantities one of the chief aims of the manufacturing companies was to maintain a certain standard form of construction, and so long as the manufacturing of the apparatus was in the hands of one manufacturer, and the users were obliged to accept anything which that particular manufacturer chose to offer just so long was it possible to produce a standard article of manufacture. There is no question but that this was a pretty good thing for the manufacturer; and for the user, it was good, too, for the simple reason that the articles offered were the best which he could secure.

While it is true that those who were operating telephone systems were obliged to accept what was offered them, and that without any effective redress, it is equally true that there was a tendency on the part of the operating companies to force the production of improved types of apparatus through inaugurating more advanced methods of operation and practice. However, until the advent of the Independent manufacturers and operating companies we were, figuratively speaking, in the throes of a rigidly adhered to system of standardized apparatus.

The writer believes that those who have closely studied telephone practice since 1894 have observed anything but a tendency to standardize the apparatus until it was found that a certain degree of superiority was obtained in a certain piece of apparatus, and not until such excellence in a certain device was universally acknowledged did the manufacturers gradually re-design their apparatus so as to comply with the acknowledged superior form of construction.

The writer believes that the experience of the manufacturers before the advent of the Independent companies conclusively shows that standardization of apparatus can never be considered as a final proposition. If we standardize a piece of apparatus, and absolutely refuse to change this standard form, it is perfectly obvious that we must also immediately cease to look for improvements in such apparatus, or even search for something which might completely change the design. In other words, standardization of apparatus necessarily means stagnation of progress.

We are entering a field which offers vast possibilities for study and application. It is easy to learn the most economical way to handle telephone service—whether it be local exchange or long distance service—and there is no excuse for any hesitancy on the part of an exchange manager to adopt a standard set of rules for the operating departments, particularly when such rules have been compiled from a thorough study of the subject.

Standardization of engineering practice, however, offers the greatest possibilities to the Independent companies.

Sooner or later they must absolutely get together upon the important subject of engineering, and it appears that a national organization should study and handle this question. Such an organization could employ a corps of broad minded engineers, each especially trained for a certain class of work. With such a corps of engineers it would require perhaps less than a year's study of the situation to permit formulating such plans, rules, regulations and methods as would place a source of information at the command of the Independent operators, which would mean the saving of hundreds of thousands of dollars.

The writer has in mind particularly the standardization of practice and engineering as related to long distance work. Not only would the Independent operator be supplied with absolutely reliable information as to the best method for constructing toll lines, but he would also be supplied with information as to the best method of handling the service in connection with whatever type of equipment his exchange may be supplied with, and at the same time he would be supplied with the necessary information for permitting him to intelligently requisition from any of the manufacturers such apparatus as would perform the necessary operation both from a mechanical and electrical standpoint. It will be observed that such a plan would permit of a uniformity in the operation of apparatus connected to all toll circuits, and although the apparatus may be furnished by one or more of the manufacturers, the electrical characteristics of the apparatus will comply with certain pre-understood requirements.

The plan will further result in causing a careful study to be made of the existing local conditions in any exchange for the purpose of making recommendations resulting in the most efficient telephone transmission service. Obviously, this necessitates a complete knowledge of the local circuits, and also involves the imposing of certain electrical requirements in the service trunks between the local switchboards and the long distance board, and it will also determine the method to be followed in handling toll service between the local exchange and the long distance board.

As respects the probable attitude of manufacturers of telephone apparatus toward the recommendations made by a board of engineers, it is not thought that any difficulties should be anticipated, provided that the electrical and mechanical requirements imposed by the engineers do not in any respect prevent the production of apparatus of any suitable design, so long as the standard requirements are complied with.

Electrically speaking, every manufacturer would probably welcome some definite understanding as to the operative limits of the apparatus to be supplied for a certain purpose. Mechanically speaking, the limitation imposed by the engineers would necessarily have to be very carefully considered, and perhaps limited to such questions as indicating the amount of break required between the contacts of keys, relays, etc., and also the kind of metal to be used for the contacts. Mechanical restrictions might further extend to providing for certain variations in the adjustments of the apparatus, designating whether adjustments shall be permanent, or whether they shall be of such a character as to permit of certain changes being produced for the purpose of permitting a variation in the electrical operation of a certain article of manufacture.

With regard to the construction of long distance lines, it would appear as though a board of engineers could consistently draw up specifications on sufficiently broad lines which would guide the more inexperienced constructor to the extent of at least placing before him methods which it is known will give satisfactory results. If the constructor who has the specifications before him has a better method, and in his opinion the method is the best one to adopt; and if general experience afterwards indicates that such methods, which may differ from the specified methods, are the best, then there would be an immediate change in the standard specifications.

As has already been stated above, standardization when rigidly adhered to will not permit any advance in the art, for when such advances are allowed to be made, the one time standard can no longer be considered the best method, and therefore, in all discussions of standardization, the limitation which it imposes upon progress must always be borne in mind.

FIFTH OHIO DISTRICT MEETING.

ONE of the most successful district meetings held this year by Ohio Independent telephone men was that of the Fifth District Association, which met at Hamilton December 6. W. Gilbert Thompson, vice president, acted as chairman of the association, which was the guest of the Hamilton Home Telephone Company. Attending the convention were representatives from each of the companies in the district including Butler, Brown, Clermont, Hamilton, Preble and Warren counties. From the reports made by the various delegates all the companies are in a prosperous condition and have shown a substantial growth. The statistical report shows a net gain of 740 telephones. The Independent telephone companies have 10,786 telephones, forty-four exchanges, 159 toll stations and 885 stockholders within the district.

Short addresses were made by L. A. Miller of Darrtown, S. M. Allen of Oxford, John McCray of College Corner, D. C. Warner of Higginsport, W. H. Baum of Batavia, Frank Binkley of Lebanon, and E. E. Cox of Eaton.

The president, Frank L. Beam, and secretary-treasurer, Ralph Reamer, of the Ohio Independent Telephone Association, were in attendance. President Beam addressed the meeting, giving a resume of the general situation in the state and the progress for the past six months. A point of special interest to stockholders and owners of Independent telephone securities alluded to in the president's address showing the wonderful development in the telephone business was the fact that the Independent telephone interests are operating more telephones in the state of Ohio today than the entire number of telephones in the United States in 1895 and that they now have in service more than twice the number of telephones operated by the opposition. It is conservatively estimated that there are now over $35,000,000 capital invested in the state of Ohio, representing over 30,000 stockholders, and that Cincinnati is the only city in the state without an Independent plant. Mr. Beam said the business interests of Cincinnati are losing thousands of dollars because of lack of Independent connections with this and other states.

James S. Brailey, Jr., president of the United States Long Distance Telephone Company, made an interesting address, in which he stated that the Independent telephone companies of Ohio are handling over seventy-five per cent of the telephone business of the state. Mr. Brailey further stated that there had not been a day from the inception of the Independent telephone movement in Ohio fourteen years ago to the present time that the Independent telephone companies had not handled a larger percentage of business today than they had the day before.

Mr. Thompson of the Hamilton Home Telephone Company, was re-elected vice president for the district, and the following were elected delegates to the state convention to be held March next in Columbus:

Brown county—George Kritzer, delegate; Harry Parker, alternate. Warren county—Frank Binkley, delegate; James Strops, alternate. Butler county—W. G. Thompson, S. H. Allen, L. A. Miller and Frank Hughes, delegates: O. M. Bake, E. L. Miller, J. W. Hutchinson and Eugene Hughes, alternates. Clermont county—W. H. Bond, delegate: J. W. Rawson, alternate.

Practical Suggestions on Construction Work

By Bernard C. Groh

OF THE various methods and devices in general use to-day for suspending aerial telephone cables to the supporting strand, the marline cable hanger is perhaps the most common. This device consists of a loop of tarred marline or housline attached to a short piece of galvanized wire which is bent in the form of a hook. The marline or housline loop is attached to the cable and the galvanized wire hook is attached to the supporting strand. It might be mentioned that marline is very seldom used in the manufacture of cable hangers; the tarred rope being what is technically known as housline, which is made up of three strands, while marline is made up of two.

The above description applies to all of the numerous types of marline cable hangers on the market. In the original design of marline cable hangers, the hook of galvanized wire was bent in the form of a letter "S" with the lower part closed, through which the housline was attached and the upper part left open in order to permit of its being readily attached to the supporting strand. The original design is still extensively used to-day.

The numerous designs on the market that vary from the above described form were developed with a view of obviating one of the objections to the "S" type. This objection is a tendency for the hook to become detached from the strand, owing to the motion of the strand and cable. Many engineers are specifying marline cable hangers for their work, although realizing that experience has demonstrated that the length of life of marline cable hangers is very erratic. Their reasons for specifying this type is not only on account of the economy in first cost, but also on account of the fact that the marline cable hanger possesses mechanical features that appeal to the majority of telephone construction and maintenance people.

In a recent inquiry into the question of the life of marline cable hangers, it was found that the life of both the galvanized hook and the housline varied to such an extent under the same climatic conditions, that a careful investigation appeared to be warranted, in order to determine if possible the real cause of the erratic life of these materials.

Looking into the question of the uncertain life of the housline, it was found that the effective life varied from three to seven years. The records also brought out the fact that the life of the housline was either very short or very long. In other words, a hanger would either have to be replaced at the end of three or four years or it would remain in good condition for a much longer period. It was found upon investigation that the housline with the short life was invariably of jute, while the durable housline was of double dressed American hemp. Further inquiry among marine supply dealers brought out the fact that jute marline or housline had a life of only from two to three years, while good American hemp housline gave good service for eight or nine years in all climates.

From the above it appears reasonable to assume that jute is an undesirable material for the marline or housline, entering into the manufacture of aerial cable hangers, and that pure double dressed American hemp should be used. Jute can readily be distinguished from American hemp. The fibers of jute are fine, short and of a silky texture, while the fibers of American hemp are long, hard and comparatively coarse. The tensile strength of new jute housline is slightly greater than that of American hemp housline.

The investigation of the behavior of the galvanized hook in service brought out the fact that the short life was due to the openings of the hooks being closed by the linemen after being placed in position on the supporting strand, in order to prevent the hooks being accidently detached. The closing of the hooks ruptured the galvanizing and the protective value of the galvanizing was lost.

The necessity for closing the openings of the hooks in the "S" type of hanger can be obviated by making the opening in the hook one-thirty-second of an inch smaller than the diameter of the supporting strand when under tension. When so manufactured, the hooks can be readily forced on the strand by the hands, and will not become detached under ordinary condition encountered in practice. This will not result in a multiplicity of sizes of cable hangers being carried in stock for the reason that certain lengths of the housline loop are always associated with definite sizes of cables. These cables in turn are always attached to a strand of a certain diameter. It is an easy matter, therefore, to provide the hooks of the housline that are used with cables which are all suspended in a certain size of strand with openings one-thirty-second of an inch less than the diameter of the strand to which they are to be attached.

WIRELESS TELEPHONY.

SPEAKING of wireless telephony the Electrical Magazine of London says:

"While the telegraph transmits an electric current so interrupted as to correspond to signals, prearranged by a given code, and therefore requiring an experienced operator for both transmitting and transcribing messages, the telephone produces variations in the intensity of an electric current to correspond to the sound waves given off by the sounding body. The more refined quality of the waves required for the success of telephony is therefore the salient reason for the present short range of wireless telephony as compared with wireless telegraphy.

"Wire telephony has never yet been successfully carried to a distance of 100 miles under water, the limit being something under sixty miles due to the distorting effect of capacity, as under the ocean the electrically conducting wires and the surrounding medium, separated by a fraction of an inch of insulation, act as the two plates of a condenser. Wireless telephony with its present range of ten to fifteen miles therefore, does not have to be extended to many times its present range to exceed that of submarine telephony.

"Wire telephony on land, however, is practised commercially up to distances of 1,500 miles, and is capable of being extended by sufficient expenditure of money to 2,500 miles or even more. The greater separation of the wires in land work and the ease with which suitable loading coils may be inserted in the lines are the reasons why land telephony so greatly exceeds submarine transmission in its range of usefulness."

THE INTERNATIONAL CONVENTION

Plans Made to Make the Independent Telephone Association's Meeting of 1908 the Greteast in Its History

ALL SIGNS indicate that the 1908 convention of the International Independent Telephone Association will be the biggest and best meeting the organization ever held—and that means a great deal. The convention will be held at the Coliseum Annex, Chicago, January 21, 22 and 23. The responses received by the officers of the association show that the attendance will be unusually large and also that a wide and general interest and enthusiasm are felt in the convention and the matters to be discussed there. Action will be taken to make the coming year a banner period in Independent telephony, and material good is sure to follow the Chicago gathering.

The first meeting of the convention will be that of the executive committee, which has been called for 1:30 o'clock Monday afternoon, January 20, when the official programme will be adopted. The advisory board will hold its conference at 2:30. Tuesday, at 10:30 a. m., the various committees on arrangements, entertainment, reception and registration will meet to prepare for the convention's work. Following are the members of these committees so far as appointed, listed by states alphabetically arranged:

Reception Committee—Chairman, Frank L. Beam, Mt. Vernon, Ohio; Henry B. Gray, Birmingham, Alabama; F. H. Nelson, St. Johns, Arizona; George Edward Knight, Los Angeles, California; J. F. Demers, M. D., Levis, P. Q., Canada; W. F. Follansbee, Paonia, Colorado; S. C. Tomlinson, Woodbury, Connecticut; Edward E. Clement, Washington, District of Columbia; W. G. Brorein, Tampa, Florida; James A. Hart, Columbus, Georgia; C. P. Bartlett, St. Anthony, Idaho; Manford Savage, Champaign, Illinois; F. O. Cuppy, LaFayette, Indiana; T. S. Miller, Grove, Indian Territory; C. A. Peterson, Manchester, Iowa; L. G. Parker, Louisville, Kentucky; W. E. Kinsman, Heath, Massachusetts; C. E. Tarte, Grand Rapids, Michigan; I. H. Goodnight, Louisville, Mississippi; P. B. Moss, Butte, Montana; T. E. Parmele, Plattsmouth, Nebraska; O. E. Eaton, Woodsville, New Hampshire; A. R. Swartz, Trenton, New Jersey; W. D. Murray, Silver City, New Mexico; L. D. Richardson, Fargo, North Dakota; A. L. Tetu, Portland, Oregon; J. G. Splane, Pittsburgh, Pennsylvania; Thomas Z. Lee, Providence, Rhode Island; R. A. Polk, Memphis, Tennessee; Albert Parlett, Bristol, Virginia; H. W. Buchanan, Barton Landing, Vermont; Heber J. Grant, Salt Lake City, Utah; J. M. Winslow, Everett, Washington; A. C. Davis, Parkersburg, West Virginia.

Committee on Arrangements—Chairman, E. E. Yaxley, Chicago, Illinois; George M. Bandy, Des Moines, Iowa; E. L. Barber, Wauseon, Ohio; H. Linton Reber, St. Louis, Missouri; Manford Savage, Champaign, Illinois.

Entertainment Committee—Chairman, E. C. Lewis, Chicago, Illinois; George E. Becker, Pawnee City, Nebraska; C. A. Camp, Henry, Illinois; M. J. Coleman, Fonda, Iowa; G. R. Johnston, Columbus, Ohio; W. J. Melchers, Alma, Michigan; Frank W. Pardee, Chicago, Illinois.

Registration Committee—Chairman, A. J. Vernier, Kankakee, Illinois; W. L. Frew, Compton, California; W. Doan, M. D., Harrietsville, Ont., Canada; C. J. Sinsel, Boise, Idaho; E. M. Popp, Ft. Wayne, Indiana; F. R. Musson, Atlantic, Iowa; Gustav Hirsch, Hopkinsville, Kentucky; Thomas Bromley, Jr., Hart, Michigan; G. W. Schweer, Windsor, Missouri; R. J. Moore, Glasgow, Montana; R. A. Duff, Nebraska City, Nebraska; Fred C. Gleason, Warren, New Hampshire; W. K. Sloan, Swedesboro, New Jersey; Charles L. Norton, Cleveland, Ohio; P. L. Brown, Silverton, Oregon; H. E. Bradley, Philadelphia, Pennsylvania; William Drury, Jackson, Tennessee; F. F. Marbury, Alexander, Virginia; H. L. Moore, Newport, Vermont; W. C. Handlon, Wheeling, West Virginia.

Sergeants-at-Arms—J. R. Mayberry, Ingersol, Ont., Canada; W. A. Ramsey, Auburn, Illinois; R. R. Falkner, New Castle, Indiana; John A. Anderson, Corning, Iowa; H. J. Jeffrey, Paducah, Kentucky; C. B. King, Ann Arbor, Michigan; H. C. Todd, Maryville, Missouri; W. H. Caman, Beatrice, Nebraska; C. D. Young, Delaware, Ohio; G. B. Rudy, York, Pennsylvania; C. Fred Bonney, Norfolk, Virginia; J. B. Hay, Bradford, Vermont; J. Walter Barnes, Fairmont, West Virginia.

At 2 o'clock Tuesday afternoon, January 21, the convention will hold its first formal session. Edward J. Brundage, corporation counsel of the city of Chicago, will make the address of welcome, speaking in behalf of Mayor Fred A. Busse. M. L. Clawson, of Indianapolis, will respond for the association. President Theodore Gary will then submit his annual report, as will the other officers of the organization. The remainder of the day will be devoted to convention papers which have been prepared by leading men from various states. These papers, and the discussions which will follow, will deal with two subjects—the financial side of the telephone business and the work of the organization.

The second day, Thursday, will be devoted to additional papers, reports of committees, election and installation of officers and miscellaneous business. The association has issued the following bulletin relating to the convention and for the information of prospective visitors:

For the Convenience of Visitors—Independent telephone men visiting Chicago are invited to have their mail sent in care of the association and to make this office, 629-30 Monadnock Block, their headquarters while in the city.

Publicity Department—In order to facilitate an extensive campaign of publicity, general and special, all in the field are earnestly requested to secure local co-operation by advising with their newspapers, learning if they desire special data and news material on any subject relating to Independent telephone matters and assuring them they will receive up-to-date, authentic and exhaustive information as they may desire. It is also requested that any telephone news items that may come to the observation of the members will be forwarded to Chicago, as well as any relative to the convention. It is urged that this department be given full co-operation in every way possible, as all members of the Independent movement will share in the benefit of the publicity campaign. All in the field are invited to keep the department posted regarding any development, affecting the business, with which they are familiar.

Convention Dates—Remember the convention dates—January 21st, 22d and 23d—at the Coliseum, Fifteenth street and Wabash avenue—in connection with the great Electrical Show, which begins January 13th, concluding January 25th.

Railroad Rates—No special railroad rates could be obtained this year but the two-cent rate laws prevailing in most of the states make the usual fare as low or lower than is usually obtained on a special rate, so that no one need be deterred from attending the convention on this account.

Credentials—Once more affiliated associations who have not yet reported the names of the delegates and alternates are urged to do so promptly. None but duly accredited representatives can be recognized.

To Delegates and Visitors—All planning to attend the convention are requested to bring detailed statements regarding the operations of their plants, showing the cost of construction and service, rental rates, plans for handling the various departments, methods of taking care of depreciation, etc. A comparison of such statements and an exchange of information and ideas will be of great

value to all attending and will be one of the most important features at the convention.

Officers of the various associations should instruct their delegates, alternates and others of their numbers, who may attend, to bring with them complete information regarding the practical operation of their exchanges. Come prepared to give and receive information that will be of direct benefit in helping to improve your properties wherever possible.

Roll Call Reports—The constitution provides that association reports presented in response to the roll call shall be in *written form.* The officers of the various associations should include in their reports the most up-to-date and complete statistics obtainable regarding the industry in the territory covered by their respective associations—stating what effect, if any, the so. called financial flurry has had on the business—with an estimate of the growth for the next year, an outline of the most important work contemplated and under way, and such other information as will be of interest in showing the progress of the movement. They are also requested to forward advance copies of their reports to the Chicago office for the use of the publicity department and for the information of the International officers in preparing a general report. Pleasant rivalry should exist as to which association can make the best report.

Convention Exhibits—So much has appeared in the columns of the telephone journals regarding the extensive exhibits of telephone and kindred appartus at the Electrical Show, that we merely call attention to this feature of the convention with a view of impressing its importance upon all who would keep in touch with the latest and best in the mechanical department of telephony. Nowhere else will you have such an opportunity to examine, at your leisure, such a varied display of everything needed for your exchanges.

Souvenir—Through arrangements just made we can send a beautiful souvenir postal of the Electrical Show to all sending us their names.

Program—Important—The convention will show strictly formal matters have been reduced to a minimum. The few papers introduced for the purpose of opening discussion will be brief and confined to topics of special importance. The program will be devoted to the consideration of vital problems confronting the Independent people and demanding an immediate solution. Every Independent telephone man in the country is concerned in these matters and all are invited to attend the convention and help decide them.

The entertainment committee will no doubt adopt some plan for wholesale recreation. The convention as a whole will be a business-like gathering of up-to-date telephone men who realize the value of co-operation and the necessity for concerted action in matters affecting their mutual interests, but who recognize the social amenities of a convention as a valuable adjunct.

Attend the convention; post yourself regarding the most up-to-date methods of conducting your business. Your advice and assistance are desired and you owe it to yourself and your associates to be present and bring others with you.

Educating the Public—At the lowest calculation, there are not less than 3,500,000 directories of Independent companies constantly in use throughout the United States and Canada. Each copy is handled many times a day by an average of at least five persons. A splendid opportunity is here presented for educating telephone users to the significance of our emblem and the existence of a vast Independent system by the use of the "shield" and the words "Independent Telephone" on the front cover of every Independent telephone directory. Are your directories properly marked?

What the Association Does for Each Operator—It stands as the centralized representative pointing out and leading all to a completed telephone system, that can only be perfected by organization.

A great Independent telephone system is being steadily and surely formed by all Independent operating companies being brought together, through co-operation, in a splendid working arrangement, while preserving the individual ownership, local investors and home management. These elements constitute the basic strength of the Independent movement.

THEODORE GARY, President.

CHARLES WEST, Secretary.

The list of delegates so far as reported is as follows:

California—Knight, George Edward, Los Angeles.

Canada—Demers, J. F., Levis, P. Q.; Hoover, Alph, Green River, Ont. Alternates—Bruce, A. D., Gormley, Ont.; Wilson, F. Page, Toronto, Ont.

Michigan—Fishbeck, A. B., Howell; Himebaugh, A. C., Burr Oak; Howard, F. M., Burr Oak; Melchers, W. J., Alma; Robinson, William, Muskegon; Stout, G. M., Lake City; Tarte, C. E., Grand Rapids; Vivian, W. S., Grand Rapids; Ware, J. B., Grand Rapids; Wing, N. F., Grass Lake; Woodbury, W. B., Detroit. Alternates—Briggs, M. W., Dowagiac; Bromley, Thos., Jr., Hart; Crabbs, W. W., Morenci; King, C. B., Ann Arbor; McPherson, R. B., Howell; Price, H. A., Bay City; Smith, R. C., Homer; Speed, J. J., Saginaw; Swaverly, C. W., Kalkaska; Young, W. A., Benzonia.

Missouri—Gary, Hunter, Macon; Reber, J. L., St. Louis; Schweer, G. W., Windsor; Snider, O. C., Kansas City; Todd, H. C., Marysville. Alternates—Bassett, W. H., St. Louis; Golliday, H. L., Holden; Hibbeler, J. B., Washington; McLaurin, W. T., Oak Grove; Scruggs, W. B., Harrisonville.

Nebraska—Duff, R. A., Nebraska City; Matfison, R. E., Lincoln; Pollock, T. H., Plattsmouth; Woods, Frank H., Lincoln. Alternates—Becker, Geo. E., Pawnee City; Hurtz, L. E., Lincoln; Parmele, T. E., Plattsmouth; Stadelman, W. J., Norfolk.

Ohio—Ainsworth, J. H., Dayton; Barber, E. L., Wauseon; Beam, Frank L., Columbus; Beatty, H. L., Ravenna; Brailey, James S., Jr., Toledo; Brucker, Judge Lewis, Mansfield; Fee, W. R., Portsmouth; Flesh, L. M., Piqua; Folsom, H. P., Circleville; Hamblin, R. E., Toledo; Hoge, James B., Cleveland; Hyde, W., Warren; Johnston, G. R., Columbus; Jones, C. L., Athens; Laubach, W. F., Akron; McLaughlin, R. M., Carrollton; McVey, C. Y., Cleveland; Mallahan, J., Ottawa; Marvin, C. H., Urbana; Metheany, G. H., Lima; Norton, C. L., Cleveland; Ranklin, S. B., S. Charleston; Rhodes, J. B., Zanesville; Sapp, D. E., Mt. Vernon; Swisher, H. P., Newark; Thedieck, I. H., Sidney; Thompson, W. G., Hamilton; Thorpe, G. P., Washington C. H. Alternates—Adams, G., Millersburg; Allen, H. M., Troy; Babst, J., Crestline; Bowron, W. H., Caldwell; Chesney, J. A., Bucyrus; Coon, E. L., Vermillion; Doudna, A. H., Bridgeport; Duncan, Charles, Chillicothe; Fuller, D. H., Clyde; Hageman, A. V., Lorain; Heller, C. C., Beaver Dam; Hess, A. J., Sidney; Hines, A. C., Mantua; Hildebrandt, H., Washington C. H.; Knapp, F. A., Bellevue; Liggett, N. E., Marysville; McDowell, J., Ironton; Norton, W. A., Kenton; Nungessor, G. E., Celina; O'Dell, D. O., Springfield; Smith, J. F., Cadiz; Spangler, O. L., Bryan; Steinkamp, J. G., Elmore; Ward, S. E., Mansfield; Warner, A., Chardon; Whitney, A. A., Mt. Gilead; Young, C. D., Delaware; Bake, O. M., Hamilton.

Oregon—Sumner, Charles E., Toledo; Tetu, Alfred L., Portland.

Pennsylvania—Denlinger, W. H., Patton; Folwell, N. T., Philadelphia; Griffith, Charles, Johnstown; Hart, Frank, Pittsburgh; Kline, C. W., Hazelton; Schade, E. D., Johnstown; Stockwell, J. F., Philadelphia; Splane, J. G., Pittsburgh; West, Charles, Allentown; Wilson, C. E., Philadelphia; Wilson, W. H., Harrisburg; Houck, F. D., Harrisburg; Rudy, G. B., York; Malin, W. L., Harrisburg; Lee, T. B., Waynesburg.

Virginia—Bonney, C. Fred, Norfolk; Parlett, Albert, Bristol.

West Virginia—Barnes, J. Walter, Fairmont; Davis, A. C., Parkersburg; Handlon, W. C., Wheeling. Alternates—Beeghley, Lloyd, Weston; Hertford, E. K., Charleston; Wise, J. H., Cameron.

OHIO FIRST DISTRICT MEETING.

C. L. NORTON of the Cuyahoga Telephone Company was re-elected vice-president and active executive of District No. 1 of the Ohio Independent Telephone Association. A. J. Curren was elected secretary.

The first district now represents a total of 65,000 telephones and fifty-seven operating companies. Frank L. Beam, Columbus, president of the state association, presented to the convention matters relating to standardization of equipment that have been working out during the last year. James S. Brailey, C. Y. McVey and W. L. Carey addressed the convention. Delegates were elected to the national and state conventions.

WHO PAYS FOR THE ADVERTISING?

The Question Answered in an Article in the Advertisers, Magazine

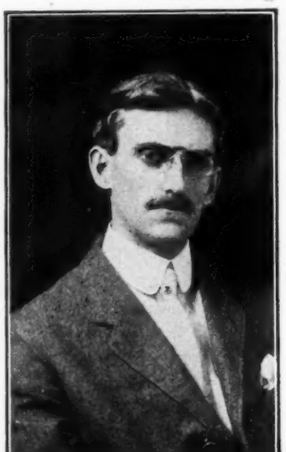
By Franklyn Hobbs, "Himself"

I HAVE heard persons say they would not buy advertised goods because they did not care to help pay for the advertising. They wanted full value in the goods themselves. I have heard salesmen argue that their firms did not advertise, and for that reason could sell cheaper. I have heard merchants say that they would not handle advertised goods. I know a cigar dealer who will not have an advertised cigar in his cases.

Sometime ago I began an investigation which I have practically completed. I had tests made of various lines of advertised and unadvertised goods, full and complete comparisons made of their respective qualities. I priced goods and bought goods in stores which did not advertise, and in stores which did advertise, and compared prices and qualities. I caused goods to be purchased from merchants who did not advertise, and from those who did advertise liberally, and made careful comparisons of the prices of the goods purchased.

Who pays for the advertising?

If it were possible I would like to answer this question in a word—but as the cost of all advertising is distributed among so many people, I must needs go into detail. Before doing that let me set your mind at rest on one point. When you buy an advertised cigar you do not pay for the advertising. When you buy a brand of advertised ham you do not pay for the advertising. When you travel on a railroad train you do not pay for the advertising of that railroad. When you buy a pair of shoes you do not pay for the advertising. This applies to every conceivable article of merchandise—every conceivable thing which enters into the commerce of the world.



Franklyn Hobbs (Himself).

Who pays for the advertising?

Advertising is an economy and not an expense—not even an investment. Advertising is a saving. You don't believe that. I didn't expect you to—I didn't believe it myself until I had absolute and convincing proof that the buyer of merchandise does not pay for the advertising.

In order to make this matter clear to the lay mind, I must use some rather homely examples: A clothing merchant on one corner does not advertise, but he pays $100.00 per month rent, employs four clerks at $75.00 per month each—pays $50.00 per month for his light, and $100.00 a month for incidental expenses, bookkeeping, etc. On this total expense of $550.00 per month he sells four suits of clothes per day at a gross profit of $7.50 per suit. This business for 25 business days a month brings in a total gross profit of $750.00, and after deducting his expenses of $550.00 leaves a margin of $200.00 per month as the dealer's remuneration for his personal services and for interest on his investment. Another merchant on the next corner pays the same rent, a trifle more for clerk hire, a trifle more for light and a trifle more for general expenses, bookkeeping, etc., and finds that his total expense for the month is $600.00—but this merchant spends $500.00 a month in advertising. Somebody pays that. Is it the man who buys the suit of clothes? No. The customer has nothing to do with it, and pays no part of it either directly or indirectly. These two merchants handle the same grades of clothing and sell the same goods at the same price. At the end of the month the advertising merchant finds that he has sold eight suits of clothes per day—twice as many as the merchant who does not advertise—and making the same profit on each suit, he finds he has a profit for the month of $1,500.00. He deducts his expenses of $600.00, his advertising of $500.00, and finds he has $400.00 left as remuneration for his own services and interest on his investment. Who paid for the $500.00 worth of advertising? Well, in this case the owner of the building paid part of it, because he received no more rent from the advertising merchant who sold eight suits per day than he did from the merchant who did not advertise and sold only four suits per day. That accounts for $100.00 of the $500.00 which is paid by the landlord—and then the electric light company paid $45.00 of it, because the light bill of the non-advertising merchant was $50.00 per month, and of the advertising merchant was $55.00 per month instead of being doubled at the same time he doubled his sales. So the electric light company and the landlord paid part of it. Then the four salesmen paid the other portion, and were glad to pay it. They had once worked for a non-advertising merchant at $75.00 per month and they are now working for the advertising merchant at an advance of ten per cent in salary. They are now getting $82.50 per month each, and each man sells two suits of clothes per day while previously they received only $75.00 per month and sold an average of one suit per day. So these four salesmen pay $270.00 of the advertising bill, and by so doing gain an increase in salary of ten per cent. And then the bookkeeper and the general expense paid $85.00 toward the advertising bill, because the bookkeeper's salary was increased fifteen per cent and the general expense increased fifteen per cent, while the business doubled so that an economy of $85.00 per month was effected. This amount went toward the advertising fund of $500.00 per month. Now, there is a comparison of your advertising merchant and your non-advertising merchant in the same business on the same street, selling the same grade of goods and employing the same grade of help. Two men, we will say, of equal ability—one of them believing that if he advertises he must increase the price of his goods, and the other knowing that the mere fact that he does advertise will enable him to sell more goods for the same price, or possibly at a less price.

Who pays for the advertising?

When I buy a hat from an advertising merchant, I am not at all interested in who pays for his advertising, as I am quite sure that I do not. The hat merchant who advertises, assuming that he knows how, can sell hats for $2.50 while the same quality of hat must bring $3.00 in a store of the merchant who does not advertise.

Get this point then fixed clearly in your mind. Advertising is an economic saving and not an extra expense.

In talking with a retail druggist regarding advertising he told me his business was not one that could be profit-

ably advertised, and that he could not afford to advertise. I suggested to this merchant that he spend one-half of the net profits of his business in advertising and he adopted my suggestion with the result that his business for 1906 was three and one-half times his business for 1905. His profits were sufficient to pay his expenses, to pay for his advertising, to pay him $285.00 per month more than he had been accustomed to draw for himself, sufficient to enable him to increase his stock of goods, as his added sales furnished additional capital, and he is to-day selling every article in his store on which the price is not regulated by the manufacturers or by the retail druggists' association at from five per cent to fifteen per cent less than he was selling or could sell these same articles before he began advertising.

Who pays for his advertising? The answer is the same as in the case of the clothing merchant. The advertising bills are liquidated by the landlord, the light company, the clerks and even by the sprinkling wagon that passes before the front of his store. He paid during 1905 $1.00 per month toward the sprinkling of the street in front of his store, and in 1906, although his business was three and one-half times as much he still paid only $1.00 to the street sprinkler.

Who pays for his advertising?

The sprinkling cart.

Being a manufacturer you say that this does not apply to your business particularly, and fits only the retail business. This applies to the manufacturer and to the jobber, to the retailer, and to the mail-order house. The manufacturer has a certain fixed overhead expense which will not increase more than ten to twenty per cent with the doubling of his output. I know factories that are closed at least one to three months each year, the major part of the overhead expenses continuing while no goods are being made. Advertising would keep these factories open twelve months in the year, would enable the manufacturer to work a night shift in the same building with the same machinery, thus materially decreasing the cost of his product, and enabling him to sell his product more profitably and at a less price.

Who pays the advertising?

The man who doesn't—advertise.

DEATH OF LORD KELVIN.

LORD KELVIN, one of the greatest scientists of the age, died at Glasgow, Scotland, December 17, aged eighty-three years. This venerable savant, who was renowned alike as an electrician, mathematician, physicist and inventor, had been suffering from heart trouble and his death, on account of his advanced age, was expected.

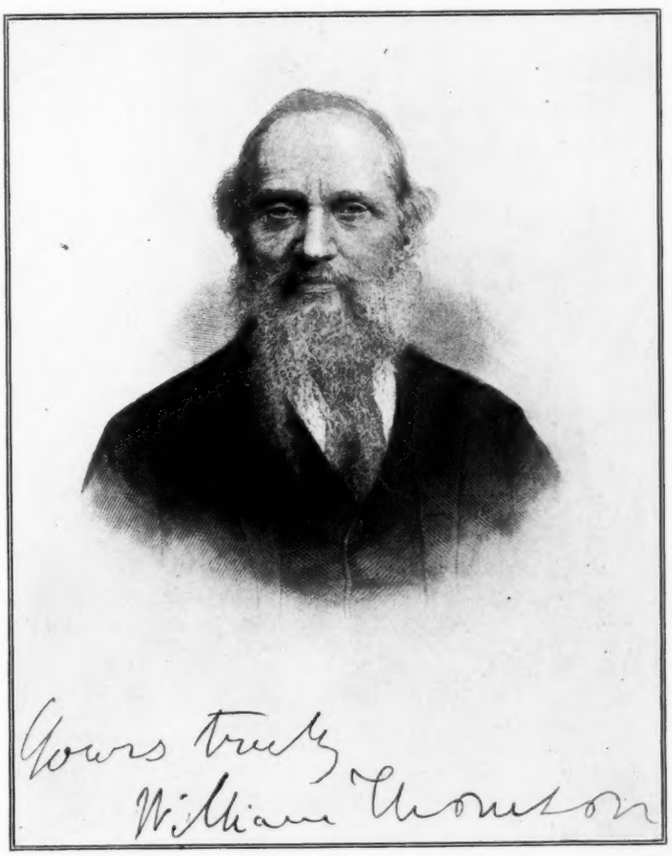
William Thompson, first Lord Kelvin, was born in Belfast, Ireland, June 26, 1824. He was knighted in 1866 for sending messages through the first Atlantic cable and was created Baron Kelvin in 1892. For his efforts in behalf of science, Lord Kelvin was decorated as a grand officer of the Legion of Honor of France, a member of the Prussian Order, Pour Le Merite, and Commander of the Order of King Leopold of Belgium. He received honors also from the Japanese and other governments. In 1902 Lord Kelvin, accompanied by Lady Kelvin, made a visit to the United States. At that time he was deeply interested in wireless telegraphy and aeronautics.

Lord Kelvin began doing great things almost as a boy, and he was still at it almost up to the day of his death. He won his chair as professor of natural philosophy at Glasgow when he was twenty-two years old and held the position for three and fifty years. Before that he had won ten chief mathematical prizes at Cambridge, and written so many papers that in recommending his election one of his sponsors described him as "recognized as the first man in science among the rising generation in Great Britain."

The various measuring and testing instruments Lord Kelvin devised fill page after page of the scientific catalogues and are a part of the equipment of every laboratory and testing station. His magnetic compass is perhaps the best known and has been of incalculable service to navigation and the safety of ocean travel.

Lord Kelvin was one of the savants who established the doctrine of the conservation (the indestructibility) of energy, the cornerstone of modern science, and his paper on "The Dissipation of Energy" in 1852 was a notable contribution to the labors of Mayer, Joule and the others who participated.

Another problem that interested him all his life was the age and past and future condition of the earth and his wars with the extravagant claims of the geologists have become classic. He would grant less than 100,000,000 years as the period that had elapsed since the earth was a molten mass, and from 10,000,000 to 30,000,000 as the period that had passed since the earth was first fit for life. He was the



The Late Lord Kelvin.

first to show that the earth is a solid and not a liquid mass with a crust on.

The present theory of the ether, the light-bearing, electricity-carrying something which fills all space, has been in large part his creation and his famous idea that what we call matter is only vortices or whirlpools in this ether may be regarded as one of the most far-reaching speculations in modern physics. The mechanical principle by which we obtain liquid air is a discovery Kelvin made in conjunction with his friend, Joule.

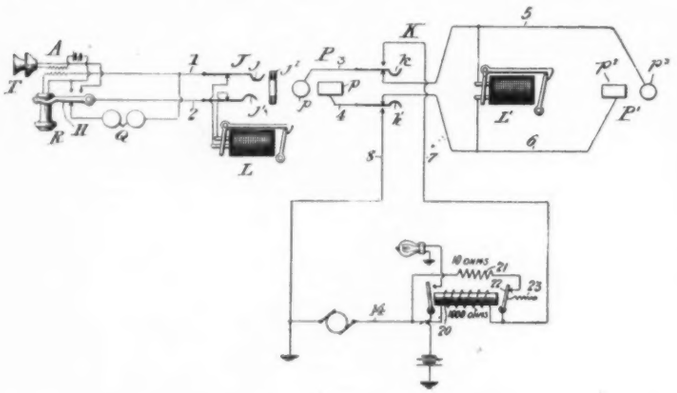
Lord Kelvin left no heir and his title died with him.

The directors of the Pittsburg & Butler Telephone Company, a subsidiary of the Pittsburg & Allegheny Telephone Company, declared a dividend of 16 per cent from the past year's earnings. The dividend in the preceding year was 6 per cent. Earnings for the year equal 22 per cent on the capital stock.

Digest of Telephone Patents

By Edward E. Clement

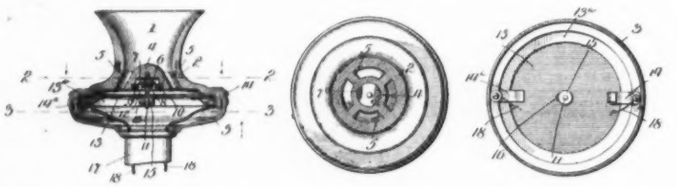
872,171. Means for Protecting Operators' Ringing Leads. Dean. The protective means comprises a high resistance relay having a low resistance shunt. The relay is provided with an armature which when retracted closes the



shunt circuit. The relay is so adjusted that it will not pull up under normal conditions but when the operator rings on a short-circuited line the shunt circuit is broken and the high resistance winding of the relay opposes the current from the generator. Patent assigned to the Dean Electric Company.

872,204. Apparatus for Fumigating Telephone Instruments. Shrader. A receptacle is provided into which the parts of the telephone subject to contamination may be inserted. In the bottom of the receptacle there is a chamber provided with an opening into which a fumigating agent may be introduced. Patent unassigned.

872,284. Transmitter. Hansen. The novel feature of this device consists in a supplementary diaphragm provided with a pin which passes through a lug on a main diaphragm.



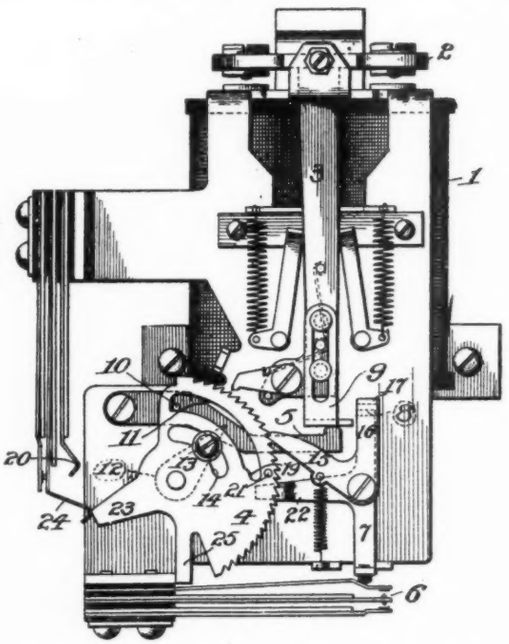
A set-screw carried by the lug is arranged to engage the pin so that the supplementary diaphragm may be locked in any adjusted position. One-half patent assigned to A. Miller Belfield, Chicago.

872,293. Ringing Device for Telephone Exchanges. Dean. Current changes in the subscriber's line operate a device which controls the ringing relay. Ringing current is placed on the called line by the operator and when the subscriber answers the relay control device instantly affects the disconnection of the ringing relay and the restoration of the talking circuit. Patent assigned to Dean Electric Company.

872,628. Telephone Pay Station. Long. In the transmitter circuit insulated blocks are arranged between which a coin deposited in payment for a message falls, thereby completing the circuit. A stop mechanism which is controlled by the hook switch retains the coin and the latter is deposited only when a subscriber hangs up his receiver. Patent assigned to Gray Telephone Pay Station Company.

872,832. Telephone-Box Hanger. Malaby &. Oxford. The telephone-box is suspended by means of a number of hangers each made from a single piece of metal and having an upwardly turned hook arranged to receive a pin carried by the box. Each hanger has a screw-threaded shank for attaching the support to the wall. Said Malaby assignor to said Oxford.

873,362. Lockout Switch for Party Telephone Lines. Forsberg. This is a step by step device. When the ratchet



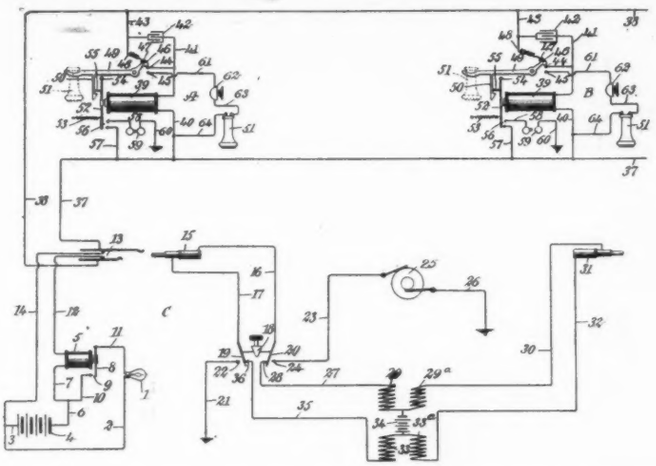
has been advanced a number of steps corresponding to the number of the station wanted the stepping arm is given a movement in the opposite direction to close contact springs and thereby complete the talking circuit of the station in question. Patent assigned to Western Electric Company.

874,004. Telephone Transmitter. Haff. This transmitter is provided with two diaphragms. The front diaphragm receives the sound waves through an opening provided for the purpose and the rear diaphragm also receives the sound waves simultaneously by means of a series of openings in the outer edge of the transmitter and channels provided with reflecting walls. Patent assigned to General Acoustic Company, New York.

874,118. Telephone Transmitter. Printz. This device comprises an annular disinfectant receptacle arranged to be

held between the mouth-piece of a transmitter and the main body of the latter. The interior of the disinfectant receptacle is in communication with the mouth-piece through openings in the latter. Patent unassigned.

873,588. Party Line Telephone System. Page. This system is provided with relays having double functions. It allows any telephone on a line to be connected up ready for ringing and talking provided no other telephone on the same line is already in use and it operates to complete the



bell circuit so that the bell may ring to announce the incoming call. Patent unassigned.

874,147. Three Wire Multiple System. Winston. This invention relates to a common battery telephone system of the type known as the three wire system in which two wires extend throughout the multiple of the switchboard section of the lines for talking purposes, and a third wire is provided for testing and signaling purposes. Patent assigned to Kellogg Switchboard and Supply Company.

861,310. Electrothermal Switch. Nolen. This device comprises a casing having a flexible portion and containing an expansible medium. A heating means is arranged on the exterior of the chamber which under abnormal conditions causes the expansion of the enclosed medium and the consequent control of a circuit. Patent assigned to Frank B. Cook.

862,542. Cable Terminal and System of Protection. Cook. This device comprises a circular base having suitable vertical brackets secured thereto and adapted to be secured around the top of a pole. Holes are provided in the base to give the brackets various mountings to enable them to fit different sizes of poles. Patent unassigned.

862,543. Cable Terminal. Cook. This terminal has a mounting base, a pair of flat sheet metal mounting strips vertically mounted on the base, a sheet metal cover placed over the terminal and spring members carried by the mounting strips and adapted to bear against the cover to hold it in position. Patent unassigned.

NEW PENNSYLVANIA ASSOCIATION.

A NEW association of Independent telephones has been organized in Pennsylvania. It was formed November 20 at a meeting held at the office of the Petroleum Telephone Company, Oil City, Pa. Among those present were: W. T. McDonald, T. L. Anderson, Harry Hamilton and A. P. Addleman, Eau Claire Telephone Company; H. R. Shawkey, Venus and Monarch Telephone Company; Mr. Mitchell, Valley Telephone Company; L. D. Corey, Conneautville Telephone Company; J. D. Fry, Centerville Telephone Company; J. W. Knapp, Clarion Telephone Company; D. W. Moore, W. S. Paca, J. H. Longstreet, Petroleum Telephone Company; George E. Bower and W. W. Shawkey, Venus Telephone Company; J. W. Wright, Meadville Telephone Company; Mr. Cottle, Forest Telephone Company. A total of 7,723 telephones was represented.

The meeting was called to order by W. S. Paca. A motion was made by Mr. Wright, and seconded by Mr. Corey, that Mr. Paca act as chairman. It was carried. Mr. Paca then took the chair and called the meeting to order. It was moved by Mr. Wright, and seconded by Mr. Corey, that "we form an association for our mutual benefit in the telephone business of northwestern Pennsylvania." The motion was carried. On the motion of Mr. Wright, seconded by Mr. Corey, a committee was appointed by the chairman to give the association a name. The chair appointed Messrs. Corey, Mitchell and Wright. The committee reported that the association be called the Northwestern Pennsylvania Independent Telephone Association. At the suggestion of Mr. Wright a president, secretary and treasurer were then elected. Mr. Wright nominated Mr. Paca for president and Mr. Mitchell moved that the nominations be closed. Mr. Wright nominated Mr. Corey for secretary, and he was unanimously elected. For treasurer Mr. Wright nominated Mr. Mitchell and Mr. Corey nominated Mr. Knapp. Mr. Knapp nominated Mr. Longstreet. Both Mr. Mitchell and Mr. Knapp declined to serve and asked the president for the withdrawal of their names, which was granted. The president then announced that Mr. Longstreet was elected treasurer of the association.

It was moved by Mr. Knapp, seconded by Mr. Mitchell, that the president, secretary and treasurer be authorized to formulate rules and by-laws for the Northwestern Pennsylvania Independent Telephone Association. The president then announced that he would like to hear from each and every one present in the interest of Independent telephony.

Mr. Corey, of the Conneautville Telephone Company; Mr. Mitchell, of the Valley Telephone Company; Mr. Fry, of the Centreville Telephone Company; Mr. Shawkey, of the Venus Telephone Company, and Harry Hamilton, of the Eau Claire Telephone Company, also made interesting addresses concerning the prosperity and conditions of the telephone business in their respective districts.

At the conclusion of the remarks President Paca gave another valuable talk with reference to better toll line connections, also the routing of messages in the shortest routes to get the best results. He impressed upon the association that better toll-line connections should be the watchword of the association.

It was moved by Mr. Wright and seconded by Mr. Corey that a committee of five be appointed to act as an advisory board to help adjust the differences which may arise between the various companies of the association. The motion was carried.

The president then appointed Messrs. Corey, Hamilton, Wright and Knapp. On motion of Mr. Wright, seconded by Mr. Corey, the president was made one of the committee.

The president announced the committee to consist of Messrs. Corey, Hamilton, Wright, Knapp and Paca.

It was decided to hold meetings at least once every three months at the call of the president, and the next meeting to be held at Oil City.

The reason for the formation of the new association is that while some of the members belong to the state association, a number of the smaller companies prefer to affiliate with an organization of a more local character. W. S. Paca is secretary and general manager of the Petroleum Telephone Company, of Oil City, which is the largest operating company in that section of the state. He says that he has found it to be a good business policy to help the smaller companies by giving them advice on equipment, construction, etc. "We stand ready at all times to assist the smaller companies in every way possible without charge," says Mr. Paca, "and in this way have had very good results in the way of getting them to improve their lines and equipments and incidentally benefit the toll business."

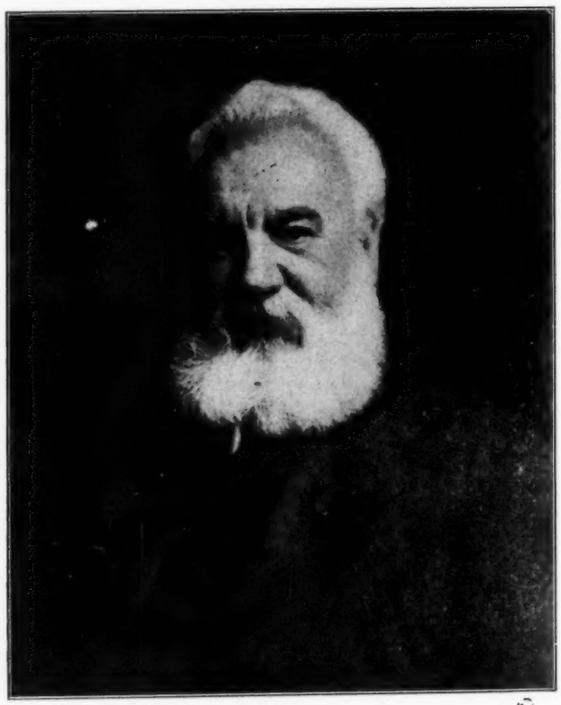
Telephonic Reminiscences

By C. E. McCluer

C. E. McCluer.

IN 1876, the centennial year of American independence, commemorated by the Philadelphia Centennial Exposition, during which Professor Alexander Graham Bell's invention of the telephone was first made public, I was manager of the Western Union Telegraph Company's office at Lynchburg, Virginia, which position I filled continuously from 1865 to 1880.

I had seen some rather vague allusions in the Scientific American to an attempt that was being made by several German scientists and electricians to transmit aerial vibrations through a telegraph wire by the agency of electricity, and had been much interested in the claim that they had actually succeeded in thus transmitting the rhythmical vibrations of musical tones to considerable distances; but I was unaware of the fact that they, as well as a number of American experimenters, were engaged upon the problem of the electrical transmission of speech, and the possibility of inducing a solid wire to carry the complex tones of the human voice as used in ordinary conversation, had never occurred to me. If such a possibility had been suggested I would have dismissed it as being utterly chimerical, as I had once considered the suggestion of multiplex telegraphic transmission, upon which the same German experimenters had been unsuccessfully engaged some years before. But that was because during my busy life I had not had the opportunity of keeping up with the increase of electrical knowledge, and was comparatively unacquainted with the behavior of electricity under the varying conditions of electromotive force and conductivity, which had been so briefly and clearly expressed in the mathematical formula enunciated by another German scientist, some years before, now commonly known as Ohms law.



Alexander Graham Bell.

It is curious to observe that two of the most abstruse problems in the domain of electricity, that such scientists and inventors as the Siemens brothers had failed to work out to a successful conclusion, and had about abandoned as impracticable, were taken up where they dropped them, and prosecuted to a brilliant success by two Americans, neither of whom was widely known as a scientist or an inventor. I allude of course to Stearns, who completed and rendered possible Siemens' unsuccessful attempt to perfect multiplex telegraphy, by the introduction of a condenser to counteract the static kick of the line wire, and Bell, who discarded the paper or parchment diaphragm of the same experimenters, and substituted the beautifully simple device of the permanent magnet with its vibrating metallic diaphragm generating an undulatory current. It seems a pity that the ingenious and enterprising foreigners who evidently worked out the idea of multiplex telegraph transmission and the electrical transmission of speech so nearly to a successful termination, could not have devised the only improvement that stood between them and success, but left the credit and emolument to be reaped by American inventors who merely supplied the missing link that would have crowned the efforts of the original investigators with success.

I attended the Philadelphia exposition in the fall of 1876, but did not chance to hear anything of Professor Bell's interesting invention, although the wonderful possibilities of the device were made public just previous to my visit, when a prominent English savant admitted that "it does talk."

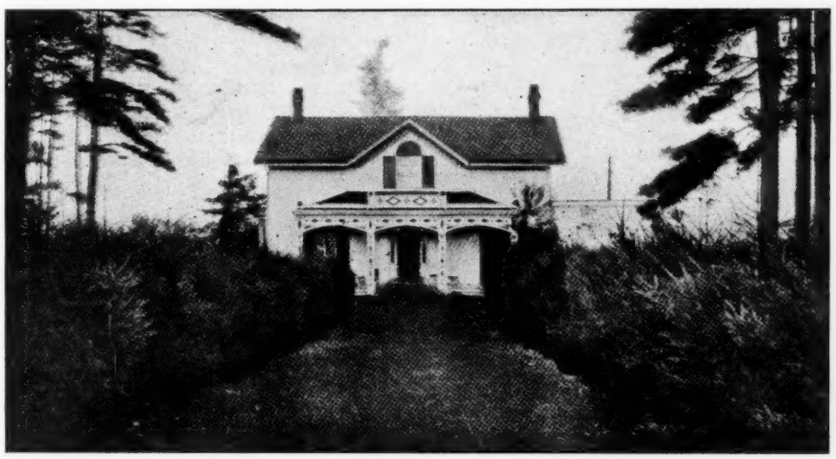
Not long after my return from the Centennial, the Scientific American published an illustrated description of Bell's invention. I at once became deeply interested in the device, and without loss of time set about the construction of a pair of telephones. I turned up the steel magnets and the dogwood cases with my own hands on the power lathes in the shops of the Virginia and Tennessee Railway Company, robbed an old and condemned telegraph relay for the fine insulated wire and wound it on dogwood spools, and made the diaphragms out of ferrotype plate given me by my daguerreotype friend, Van Ness. I magnetized the hardened steel rods by means of a helix I made for the purpose, using as an exciter the current from one of the telegraph main batteries.

When completed, I tested the two instruments on a short telegraph line I had for some time been operating between my office and my boarding house. To my great surprise and gratification I found they worked admirably, and that a perfectly satisfactory conversation could be carried on over the line. As far as I know, they were the very first telephones ever used in the state of Virginia. I made them in the late summer or early fall of 1876, but a short time after the first public announcement of the invention of the telephone.

I used the telegraphic main-circuit sounders with which my telegraph wire was originally equipped, for calling, but of course discarded them in favor of the telephones for talking. It soon became known that I had the telephones in use, and they excited a great deal of interest. My wife was kept busy answering calls from my office and talking through the telephones to our friends and acquaintances, all of whom were greatly astonished at the ease and distinctness with which they could hear and be heard, and the popularity of the telephone in Lynchburg was assured. So that a year or so later I had no difficulty in working up

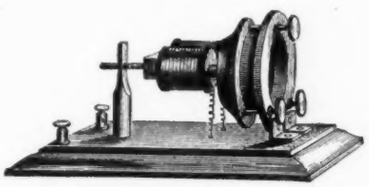
one of the first, if not the very first, regular telephone exchange systems operated in the southern states. But I anticipate.

I wish now to relate several of my earliest experiences with the telephone. The reader must remember that I am writing of the early history of the wonderful "far speaker," when the infantile wonder was but a few days old. I had never seen other telephones than those made by my own hands in conformity with the instructions and description in the Scientific American, nor had anything come under my observation regarding the experiences of the inventor and his early associates. I was, therefore, delving in an entirely new and unexplored field where the nuggets of truth had to be laboriously pried out with the crowbar and pickaxe of careful observation. The enlightened and scientific telephonist of the present must, therefore, make all due allowance for the circumstances under which I was laboring, to enable him to understand and appreciate the experiences I am about to relate. To him they will doubtless appear as childishly simple, as they were vaguely mysterious and interesting to me at the time.



Birthplace of Alexander Graham Bell at Brantford, Ontario, Canada.

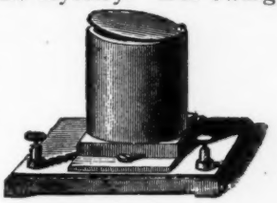
My landlady was a highly educated and intelligent woman, the relict of a prominent preacher in the Presbyterian church, and the principal of a prosperous local female seminary. She was almost as much interested as I was in the telephone, and was exceedingly anxious to see and use the ones I was making. I had tested the recently completed instruments with my wife immediately after dinner, withholding the announcement of their completion until I made sure they would operate. At the supper table I arranged for Mrs. Ramsey to try the telephones with me after my return to the office, taking her to my wife's room, showing her the telephone, and instructing her how to use it. I charged her particularly to transfer the instrument from her ear to her lips immediately, in order to respond to my greetings, and to her ear again instantly, in order to hear my reply. As soon as I reached the office I called, and told my wife to let Mrs. Ramsey have the telephone,



Bell's original telephone transmitter.

first repeating the charge about transferring it to her lips to respond to me. After a suitable interval I inquired "Mrs. Ramsey, do you hear me?" and at once listened for her reply. But none came. I repeated the inquiry, when my wife laughingly responded with the information that Mrs. Ramsey was evidently so overpowered with the strangeness and novelty of the sensation, and the peculiar, though perfectly familiar, tones of my voice as it reached her ear through the telephone, that instead of carrying the instrument to her lips as instructed, she extended it at arms length, and with distended eyes and awe-struck mien, she uttered a faintly audible "yes," dropped the instrument and rushed out of the room. Mrs. Ramsey afterwards affirmed that it was impossible for her to explain her sensations when she heard my voice with its familiar intonation issue from the telephone. She averred she was almost struck dumb with astonishment and awe, from which she did not recover for hours.

My boarding house was less than a half mile from my office, and my house wire was strung on the telegraph poles the entire distance. Of course I continued to utilize the earth as the return for my telephone circuit, as I had done for the telegraph circuit, the wire being grounded on the water pipes at each end. From the night the telephones were installed my attention had been attracted to the mysterious whisperings and strange frying noises which were heard almost constantly through the telephones, particularly during the quiet hours of the night. It became my custom when I went home at night, no matter how late it was, to spend a few minutes listening to the strange and at times almost uncanny noises that the telephone gave forth, and speculating as to their origin. My telegraph instruments had never offered any indications of earth currents, except during the prevalence of an auroral display, and while I had learned that the atmosphere was continually traversed by electric currents in greater or lesser profusion, it had never occurred to me that the bosom of old mother earth was permeated and torn by similar electrical manifestations. Hence the weird noises and faint peculiar cracklings which my telephones for the first time revealed to me were fascinating to me, and I spent much of my leisure time in a study of the interesting phenomena, with the hope of arriving at a satisfactory solution of their origin. The subject of electrical leakage and induction had not then been brought to my attention, and I listened to the faint and mysterious utterances of the telephones as though they were spirit whisperings from another world. Could I have heard and recognized the faint dots and dashes of the Morse telegraph code, I would the sooner have arrived at a solution of the mystery. But owing doubtless to the



Bell's original telephone receiver.

short length of my house wire, the leakage or induction from the telegraph wires did not seem to affect the telephones audibly.

One Sunday night on returning from church, I placed the telephone to my ear with the intention of spending a few moments in further observation of the phenomenon that was engrossing my attention. The mysterious noises were still there—noises that I cannot adequately describe, but which must be heard to be appreciated—when, just as I was about to remove the telephone from my ear, I heard what at first impressed me as being an angel voice from

the spirit land, rendering what to my excited senses seemed to be a most heavenly and ravishing melody. It is needless to assert that I was startled—dumbfounded. Here was another and an entirely different phase of the weird and unearthly utterances of the telephone which I had been pondering over for some days. I am not at all superstitious, but I confess that a strange feeling of awe and solemnity crept over me, and for an instant I was inclined to believe that I had in some mysterious way opened up direct communication with the spirit world. But a moment's sober reflection assured me that I was listening to a human voice, though of a peculiar sweetness and timbre. Further consideration caused me to discard the half-formed suspicion that a lady friend of the operator on duty at the telegraph office was amusing herself and companions by singing into the telephone at that end of the line, for that was most unlikely, and besides, the voice did not sound as it would have done had it come to me through the other telephone. Calling my wife, I put the telephone to her ear, half suspecting that I was dreaming, or was the victim of some strange hallucination. But after her first exclamation of astonishment, she excitedly remarked, "Someone singing 'Jesus Lover of My Soul,'" and a second after, "There is a man singing also." I snatched the telephone from her ear, and sure enough I now heard a male voice in addition to the female voice heard before. But I soon discovered that they were not singing a duet, as my wife had suggested, but the male voice was rendering another Sunday school air, and in an entirely different key. The wonder grew upon me. I became so excited I could not remain still. My wife partook of my excitement. We listened alternately to the mysterious music so strangely wafted to our ears from, as it seemed to us, that "bourne from which no traveler e'er returns!" For a half hour or more the weird music continued almost without intermission. Much of the time we heard both voices simultaneously, but the discords between their tones proved they were not singing in concert. Then the female voice would hush and the male voice would reach our senses alone. Then they would blend again, not in harmony but in discord, till the male voice would be silenced and the female voice would come to us alone, melodious, soft, sweet, peculiar, with a tone quality or timbre suggestive of angelic choirs and heavenly bliss. Finally the mysterious voices died away into silence, after each had rendered a half-dozen or more familiar hymns and Sunday school songs.

During the whole of this mysterious and to us unaccountable Sabbath evening concert my wife and I scarcely spoke above a whisper, lest we should break the spell. We strained our ears to catch the words of the hymns, but ineffectually. While the melodies of the various compositions rendered were strikingly clear and distinct, not a word of the familiar hymns could we recognize. After the apparently celestial voices had hushed in silence, the same weird whisperings, and moanings, and flutterings that had during the concert seemed suspended, resumed their sway over the telephone, and my wife and I gazed at each other in silent awe and amazement. What and who could it have been? Where could it have come from? we asked, after recovering our speech. I called up the telegraph office and asked whether anyone had been using my telephone. But while asking the question I knew the reply would be in the negative. Tones of such heavenly and ravishing sweetness, such peculiar character, did not, I was assured, come through the telephone in my office. Where, then, did they originate? I could not even surmise. No former experience or acquired knowledge threw any light upon the questions or enabled me to answer them intelligently. I, therefore, sought my couch at a late hour with my mind wrought up to such a pitch of interest and curiosity that sleep did not visit my eyelids till well on towards morning. But I speculated; I theorized; I questioned; I racked my brain for an explanation, but it was not forthcoming.

I had long since learned that there was always a cause for every effect, and as I have before asserted, I was not superstitious. While my experience of the evening savored of the unearthly, I knew the occasion of that experience must have been of earthly origin. I therefore determined to ferret it out on the morrow. Perhaps someone else, like myself, had become interested in the science of telephony, had made a pair of telephones, and was testing or trying them in a way that had never occurred to me. But why should two people be singing into them simultaneously and each apparently entirely oblivious of the efforts of the other? And how could, or why should, their voices encroach on my little telephone circuit? A bewildering multiplicity of such questions recurred to me again and again, until my brain was weary and my understanding benumbed, and I at last fell into a restless slumber which was shortly dispelled by the early dawn. Again I wondered and speculated, and without waiting for my breakfast, I rushed to the telegraph office and called up the various railway offices adjacent to Lynchburg and inquired if anybody in their neighborhood had a pair of telephones, and if they were being experimented with the night before. By persistent effort and inquiry I finally solved the problem and went to my breakfast a wiser and better satisfied man.

I learned that morning for the first time, that the managers of the Western Union offices at Staunton and Charlottesville, like myself, becoming interested in the electrical transmission of sound, had been delving in the field of telephony; but following after the example of Messrs. Siemens and Halske, under the tutelage of a young student of Washington and Lee and the Virginia State Universities, Brown Ayres had been experimenting with the make and break principle, rather than the undulatory theory of Professor Bell; that is, the transmission of rhythmical musical tones, rather than the more complex conversational tones of the human voice. To this end, they had each without the knowledge of the other, I think, certainly without my knowledge, made what they had dubbed break-circuit singers, and had been experimenting with them. These break-circuit transmitters were fashioned, I believe, somewhat after the pattern of the original Siemens transmitter, only they were very crudely made, being nothing more nor less than a wire or wooden hoop covered by a tightly stretched paper diaphragm. To the center of the diaphragm was cemented by sealing wax a small bit of thin sheet platinum, which, with a fine wire-coil connection, formed one electrode. Through a threaded hole in a stout metal standard was screwed a platinum tipped screw which was readily adjustable directly opposite the center of the platinum plate cemented to the paper diaphragm. This platinum tipped screw constituted the other electrode. With a voltaic battery connected to the electrodes, and the screw properly adjusted, the circuit would be opened and closed at every vibration of the diaphragm. A musical tone sounded by an instrument, or emitted from the vocal organs, in front of the diaphragm, would cause the latter to vibrate in exact unison with the aerial vibrations impigning upon it, and by alternately opening the circuit by the wave of rarefaction and closing it by the following wave of condensation, would transmit electrical impulses of equal rapidity along a wire to which the transmitter and battery were connected in series, which would be transformed into aerial vibrations again at the distant end of the line by a suitable translating device.

Not possessing a supply of the superlatively sensitive Bell telephones like mine, these telegraphers were compelled to content themselves with the telegraph relays as receivers. In order to make the comparatively insensitive relays perform satisfactorily the duty of receivers, it was necessary that they should be actuated by a current of considerable tension and volume. Hence these experimenters drew on their main telegraph batteries for current with which to operate their transmitters, and Sunday was the only day in

the week when they could do this without detriment to business. Each manager had completed and tested his break-circuit singer on the Sunday morning in question, and finding that they worked satisfactorily, had arranged for a concert that evening, to be given by musical friends whom they invited to their offices for that purpose, with the telegraph operators on the railway wires for their audiences. One of them, the Staunton manager, my life-long friend, J. W. Crews, now the assistant general manager of the Southern Bell Telephone Company, made use of the Virginia Central Railway wires, extending along that highway from Staunton to Richmond, while the Charlottesville manager, my friend Walstrum, arranged for his unique concert to be given on the Virginia Midland Railway wire extending along the railway from Washington to Lynchburg.

While these two railways pursue a general course almost at right angles to each other, they at the time I speak of used jointly the Virginia Central tracks between Gordonsville and Charlottesville, a distance of twenty-one miles. The railway wires were strung on the Western Union poles the entire distance between the four places mentioned, and the entire number of wires traversing the right of way of the two roads. were massed upon the single line of poles for the twenty-one mile stretch between Gordonsville and Charlottesville.

These being the conditions, the effects observed in my telephones will be perfectly patent to the experienced telephonists of the present day. But to me, at that time, as well as to all experienced telegraphists without telephonic knowledge or experience, the incident was little less than marvelous. When I told the Staunton and Charlottesville managers that I had heard their concerts of the night before through the telephone on my little line in Lynchburg, they were skeptical, and would not believe me until I told them what hymns were sung and had convinced them that I was not trying to guy them.

It was finally explained to me that a lady friend of the Staunton manager had kindly consented to sing to his sound transmitter for the benefit of the telegraph operators on the Staunton and Richmond wire, while a male vocalist did the same for the Charlottesville manager and his telegraphic confreres on the Washington and Lynchburg line; the telegraphers at the distant stations being able to hear the musical tones as translated by their relays, by placing their ears close to the cores of the electro magnets. These facts readily account for the two voices that I heard, both separately and simultaneously, through the medium of my telephone, while it was impossible for the listeners on either one of the two wires to hear a single tone from the other. Not because there was no leakage between the wires, but because their insensitive relays were not able to translate the feeble leakage currents into aerial vibrations, as did my much more sensitive telephone.

It was plain enough after I had learned the conditions, why I should have heard the Charlottesville singer so distinctly, because the railway line he was utilizing came direct to Lynchburg and entered the telegraph office parallel wtih my residence wire from the office pole to the switchboard in the rear of the long office room. The effects of induction I had experienced but faintly in connection with the telegraph lines, but I reasoned that the telephone being a much more sensitive instrument than a telegraph relay, the effects of induction might be displayed by it even when the parallelism of the two wires extended for such a short distance. But what puzzled me most was the fact that I had heard the voice of the Staunton singer if anything more loudly and distinctly than I did that of the Charlottesville vocalist, when the Staunton and Richmond line approached no nearer Lynchburg than the twenty-one mile stretch between Gordonsville and Charlottesville, over fifty miles away. Surely, I reasoned, induction could not produce such a pronounced effect at that distance, and I pondered over the problem until I arrived at the conclusion that induction could not be held responsible for the effect I had observed. What then *was* responsible? I asked. After much cogitation I settled down to the conviction that it must have been leakage! Leakage, pure and simple, and as I now know, in strict conformity with Ohm's law. Or if there was any effect from double induction, induction from the Staunton and Richmond wires to the Washington and Lynchburg wires where they paralleled a distance of over twenty miles, and then induction again from the Washington and Lynchburg wires to my house wire where they paralleled inside the office only, it must have been infinitesimal in degree. And yet I heard the Staunton singer if anything more loudly than I did the Charlottesville singer. The superior electrical carrying power of the female voice perhaps might account in part for that fact, but subsequent experience only confirmed me in my belief that leakage, leakage from wire to wire, and from wire to earth, and again from earth to my wire, must have been the principal agency in bringing the voices of the vocalists to my ear.

This incident, coupled with the recollections of my experience with the auroral current on the telegraph wires several years previous, led me to question the correctness of the then generally received opinion or theory that the earth was a vast reservoir of electricity which offered no appreciable resistance to the passage through or into it of an electric current, and paved the way for the invention of my common return device several years later. If, I reasoned, the earth was an inexhaustible reservoir of electricity of infinite capacity, and if all electrical currents naturally sought its bosom, why did the leakage from the Staunton and Charlottesville telegraph batteries want to pirouette along my inoffensive little telephone wire? I may add in closing this incident, that I still possess the two home made receivers used on my pioneer telephone line at Lynchburg, and they are yet serviceable instruments.

Mr. McClure's Reminiscences will be continued in our February number.

CABOOSE TELEPHONES.

THE Railway and Engineering Review calls attention to the fact that the Oregon Short Line railway has a train telephone service for its conductors north, east and west of Pocatello, Montana. That it is practicable is demonstrated by its service for the last two years. Some forty cabooses running in and out of that city have a private telephone connected with the dispatcher's office. About half a dozen other cabooses at Glenns Ferry and Montpelier, Idaho, and Luma, Montana, have these modern conveniences, as have also each wrecking car and the private cars of the road superintendents.

The arrangement consists of a dry cell battery, having a ground wire attached to one of the bolts of the caboose track, which in turn connects wheel and rail, which, being imbedded more or less in the earth, constitutes the ground wire. With the telephone goes an 18-foot pointed rod, and 100 feet of telephone wire, the rod is equipped with a hook, and whenever the train has to stop for cause, or a wreck has to be reported "cleared," all that is necessary is to connect the rod, hook on to the telegraph wire which leads to the dispatcher's office.

No telephone wire is necessary, and both telegraph and telephone message can be sent simultaneously over the one and the same wire. This service, being intermittent, is adapted for territory where there are long distances between stations, hence its use is not called for on the Utah division.

Sixty thousand messages are said to be spoken over the telephone every day in London. The number of words per message cannot be estimated. It varies with the language used while the subscriber is waiting.—London Globe.

Questions AND Answers By H. P. Clausen

REGARDING USE OF ALUMINUM LINE WIRES.

NOTE some discussion regarding the use of aluminum wire. For your information would state that I have used a few miles of No. 12 B. & S. aluminum wire, same being tied in with a special soft tie wire manufactured by the company that manufactured the wire, and that in spite of all we were able to do the vibration of the line wire would cause a great deal of trouble by wearing the line in two where the tie wire wound around it or if the tie wire got a little too loose it would wear in two against the glass insulators. This wire was under my direct charge for a couple of years and I have had further information relating to it several times and the results have always been as stated above. I understand the larger sizes of the wire do not give much trouble of that kind. A. F. A., Missouri.

The editor shall be pleased to have some further discussions upon this question of aluminum wire, and suggests that those who have used it communicate their experiences to us.

COMMON BATTERY SWITCHBOARD SYSTEM.

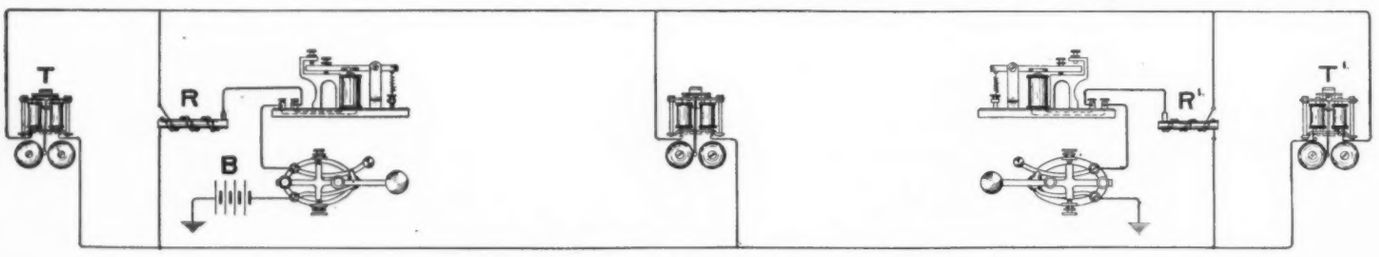
Please explain the principle of operation of a common battery ballast switchboard. M. N. H., Ohio.

We expect to present at an early date a technical description of the Ballast type of switchboard, and suggest that you watch the columns of TELEPHONY for the purpose of obtaining complete information upon this type of a system.

PRIVATE LINE TELEGRAPH AND TELEPHONE CIRCUIT.

I have a metallic circuit telephone line extending between my house and that of a friend—eight miles away. There is an intermediate station upon the line as well as an instrument at each end. The instruments are bridging. I would like to operate a telegraph circuit in connection with this line. Will you give me a simple diagram showing how this is done? R. T. C., Washington.

The illustration shown herewith practically gives you the information called for. *T* and *T1* represent the telephones on the end of the line and you will observe that intermediate telephone station has been connected across the center. *R* and R^1 represent impedance coils. These coils are wound up in such a way that the number of turns upon the two windings are exactly equal. Usually the wire is wound parallel upon an iron core. Telegraph sounder and key it will be observed are connected through the battery *B*, which is placed at one end of the line. With your windings of the impedance coil *R* and R^1 properly proportioned, and the resistance of each winding say is something over 100 ohms, you should obtain a very satisfactory service. The battery *B* should be of the closed circuit type and it will depend entirely upon the resistance of the line wires and the sounders used as to what voltage the battery must deliver current. The sounder may be of the twenty-ohm type.



A telephone equipped for telegraph service.

SOMETHING ABOUT REPEATING COILS.

Why is it that a repeating coil connected between a grounded and metallic line does not transmit all noises and sounds. L. S., Pennsylvania.

Your inquiry is not sufficiently clear for permitting an intelligent answer being made. Information should be submitted as to the exact information wanted.

As a general rule, however, repeating coils are inserted between grounded and metallic lines for preventing disturbances from adjacent circuits from affecting both the metallic and the grounded line, as would be the case when the repeating coil is not used. Aside from a slight loss in the transformation, any current which pases over the grounded line and through the repeating coil winding connected to the line, must necessarily induce a like current in the secondary winding of the coil.

A PARTY LINE CONNECTED WITH TWO EXCHANGES.

We have a full metallic telephone line, to which are connected twenty-six 1,600-ohm ringer telephones. This line extends into our exchange, and we wish to reach another exchange, three miles away, so as to permit subscribers to signal both central offices simultaneously. What resistance should the drop coil be wound to, and also would it make any difference in the signaling service from the exchange over the lines should the circuit run six miles beyond the exchange, which we propose to connect to the line. S. J. K., Illinois.

You fail to state the length of your line circuit, nor do you refer to the size of your line wire, and the distance between the different telephones.

It is suggested that if your line is not of an exceedingly great length, you should install signals in the switchboard wound to approximately 1,000 ohms, and as a rule, when a second exchange is connected to the line, the signal coil should also be wound to at least 1,000 ohms. On very short lines it is advisable to install 650-ohm drops in the switchboard. By *short* we mean lines not over ten or twelve miles long, and it also is assumed that the generators in the telephones are in good condition.

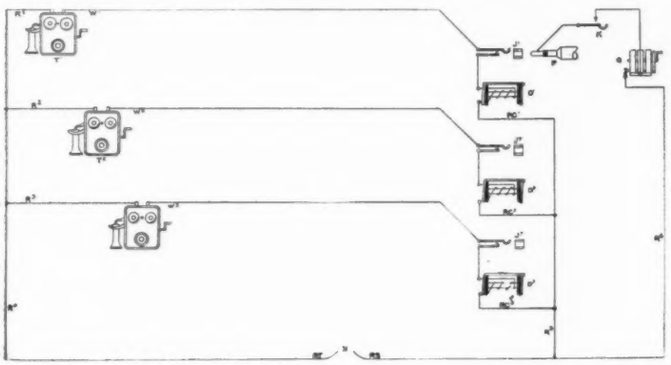
You ask whether it makes any difference in the signaling out from the switchboard when you add additional line length and drops across the line. You may be certain that it

will make a difference, but without knowing all of the local conditions including capacity of generators, etc., it will be difficult to state whether the difference is enough to affect the satisfactory operation of your exchange.

CROSS RINGING CAUSED BY OPEN COMMON RETURN WIRE.

I have a system of three telephones which connect to the switching apparatus at my residence. I use single wires for the telephones and a common wire for the return circuit. This system has been operating very satisfactorily until recently. I find by signaling out over the line that both of the remaining telephones connected to the line are interfered with through their signal bells operating. I have also had more cross talk than usual. It is the signaling interference which causes the most trouble. What may the difficulty be? S. P., Iowa.

Referring to the drawing shown below, the switchboard drops and jacks have been shown at *J* and *D*; the tele-



Broken common return wire causes cross ringing and cross talk.

phones at *T*; the line wires at *W*, and the return wire at *R*. Telephone generator *G* connects to the plug *P* by means of the wire *R-C* and key *K*. Place the plug *P* into the jack *J-1*, and when the common return wire is broken at the point *X* or anywhere between the switchboard and the telephones, observe that the ringing current which is passed out over the line wire *W-1* cannot return to the drops without going through the telephones *T-2* and *T-3*. That is the entire cause of your difficulty. Find the break in your return wire, repair it, and the trouble will disappear.

OPERATING POLE CHANGER WITHOUT RESISTANCE IN RINGING CIRCUIT.

Should a pole changer be operated with the usual 80 ohm resistance or tell-tale buzzer found in all switchboards? What would be the effect if the resistance were eliminated altogether and the pole changer connected to the ringing circuits without any buzzer or resistance coil connected in the line? C. T. C., Illinois.

The object of the tell-tale buzzer in the ringing circuit of a switchboard is to permit an operator to quickly determine whether a line, which is being signaled over, is open or closed, determined by either the buzzer failing to operate or producing the well-known characteristic rattle. If you remove the buzzer from the circuit, it is not wise to connect the terminals together without any resistance. The purpose of the resistance is to prevent the flowing of too large a current from the pole changer over the cord and line circuits.

Let us say that you have connected the ringing terminals of the pole changer together. You will observe a very intense sparking at the contacts of the vibrating elements of the machine, and perhaps you may even destroy the usefulness of the contact springs. If instead of connecting the wires together at the pole changer, let us say you are ringing out over a short-circuited line and that you have less than ten or fifteen ohms resistance in the circuit. Work your ringing key, and if you were to examine the contacts of the ringing key, you will find them very badly burnt, as well as the contacts of the pole changer springs. This burnt effect, however, will not be present to a destructive degree, if you leave the resistance in the circuit, for then you can pass only a comparatively small amount of current; at any rate, not enough current to burn up the contact springs in the pole changer and damage the contacts in the ringing key.

TRANSPOSING GROUNDED LINES.

Will you kindly inform me regarding the transposing of grounded lines on poles where only two brackets are used? Would it be practical to run two grounded wires on brackets on the opposite sides of the pole, one eighteen inches above the other, without transposition? If transposing is necessary, how is it done on such lines? G. H. G., Alabama.

You appear to believe that the transposing of grounded lines will prevent cross talk between the two lines. It is suggested that the only way you can keep down the cross talk between the two lines is to keep the wires as far apart as possible. The transposing of the two wires towards each other will not eliminate any cross talk, and, therefore, your line need not be transposed.

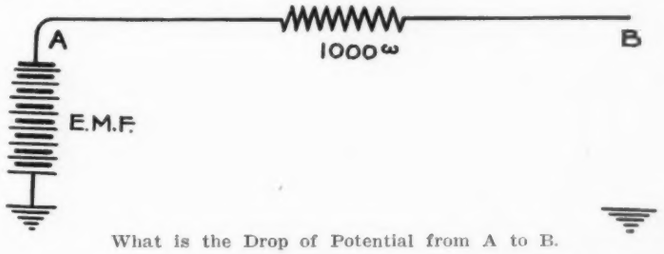
BOOKS UPON WIRELESS TELEPHONY.

I am interested in wireless telephony and ask whether you can advise me as to the most complete publications on the subject that are available at the present time. A work that describes all of the best known methods and apparatus will be especially appreciated. F. M. M., Missouri.

We have before us two books upon wireless telephony. One by Ernst Ruhmer, published in Berlin, Germany, in the German language. It contains 139 cuts and the book is made up in 151 pages. It sells at $2.25. The diagrams are thoroughly self-explanatory, although a knowledge of the German language is essential to thoroughly appreciate the importance of Mr. Ruhmer's explanations. Another book published in America under the title of "Wireless Telegraphy and Telephony," by D. Mazzotto, 1906, also give excellent explanations and may be purchased for $2.00.

A QUESTION AND ANSWER CONSISTING OF IF'S.

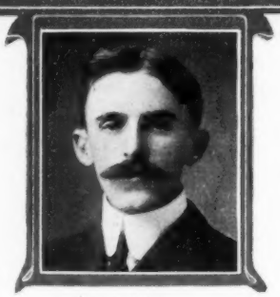
If we had a sufficiently sensitive volt meter and measured the difference of potential at *B*, as per diagram, we can measure the drop of potential from *A* to *B*, said drop being caused by the flow of current necessary for permitting the volt meter to register it. Now, as we know, according to Ohms' law, that there is no drop of potential until the current flows, and if it is possible to take a reading at *B* without using any current to do it, what would the difference of potential be at *B*? L. S., Philadelphia.



What is the Drop of Potential from A to B.

In your question you have already indicated that if it were possible to measure the potential at point *B* without the flow of any current, that no energy is being consumed, and when we do not consume any energy, we cannot expect to obtain any such movement as will be required in any conceivable device for indicating the potential. If you can conceive of such a device, then we must disregard any drop of potential across the resistance coil. Therefore, the voltage at *B* will be exactly equal to the voltage at *A*. That this must be true can easily be proven by leaving the line wire stand open at *B* and connect the volt meter across the resistance between *A* and *B*. As there is no flow of current between *A* and *B*, there cannot be any difference of potential, and this of itself proves there is no drop of potential present; and, therefore, the difference of potential from *B* to earth—under the conditions assumed—must be the same as the difference of potential between *A* and earth.

Manson's Practical Suggestions
By Ray H. Manson



Ray H. Manson.

THE dry cell has practically supplanted all other forms of primary batteries for local battery or magneto telephone use. It has also been found to be a convenient source of direct current for various telephone exchange purposes. In fact, it has become so commonplace that little thought is given to its proper installation and care. The external make-up of various makes and grades of dry cells also differ but little, thus the same results are expected regardless of the original cost.

Excepting for the convenience, the dry cell is a very expensive means for producing electrical energy. Furthermore, there is little chance for reducing this cost unless raw materials, used in manufacturing the cells, can be obtained at a low figure and the labor item likewise cut down. It is a fact that dry cells of the same external size vary in cost through a large range, but when there is a big difference in price it is practically certain that the grades of construction also are different. In other words you pay for more electrical output in the expensive cell and should get it. This is for the user to determine.

The usual procedure in testing dry cells is to install them in telephones, pole changers or other current using devices and keep track of the number of days actually in service. This is a safe method as far as wear and tear is concerned but it is liable to mislead. For example, a new rural line is built and ten or more telephones installed. Apparently this gives an ideal condition for testing a certain make of dry cells, but unless the cells are very efficient and the transmitters on the telephones of normal high resistance, a short life for the dry cells can be counted on. If the cells are of an untried make they will be unconditionally condemned, otherwise, there is a possibility that the telephone manufacturer will come in for the complaint—"poor transmitters of low resistance." Now this is what actually happens. The line is new, also the telephones, and there is no law against "rubbering" so that if the system actually works, the batteries will get their full share of use, for it is practically certain that some one of the ten or more bridged telephones will be constantly employed in talking, while a large percentage of the remainder will be used in listening. The latter will waste almost as much battery current as is used by the former. It is true that this condition changes after the novelty of the telephone has worn off, so that the listening-in habit is partially overcome, but sometimes too late to save the reputation of the battery maker or telephone manufacturer.

There are other cases in which the dry cells are not given a fair test. Take a pole changer or multi-frequency pole changing set for exchange ringing purposes, here a large number of dry cells are used, from forty to 100 of the six-inch size, grouped in series or series multiple as required. If the cells are fresh and properly installed they are expected to give service for an indefinite time regardless of the amount of work performed by the ringing device. Unfortunately, dry cells are not uniform in action even though the same make and size, consequently some have a longer life than others. Now, if one cell becomes bad and is located in a group of cells, which are connected in series, the whole series will be effected. If this series is one of several which are connected together in multiple to form a complete battery (see Figure 80), the majority of the current for operating the pole changers will come from the other sets of series. There is nothing to prevent cells in the other series from becoming bad also, so that there is a chance for all but one series to be practically out of commission. This one series of good cells will operate the ringing device with indifferent success until it will become exhausted, hastened by the excessive load thrown upon it by the failure of the other series of cells. When this stage is reached all indications point to a poor lot of cells or a very efficient pole changer. If the latter is a new device it will receive all the censure, and possibly a brand new set of cells will be provided to give it another trial. It does not take much study to see that this last example is another poor method of testing the output of dry cells, for even if the cells were uniform in action and no record made of the actual amount of ringing done by the pole changer (number of calls made and duration of ringing on each call) no definite results would be obtained.

The external construction of dry cells of the same size show little of their possibilities as current producing mediums, also a superficial study of the internal mechanical construction tells but little. Figure 81 shows a cross section view of a well known form of dry cells made in No. 6 on standard telephone size. The carbon or positive (+) electrode is corrugated so as to expose a large surface and is reduced to about 5-16 x 1 inch at the top where it projects through the sealing compound.

The negative (—) electrode is of zinc and forms a cup or containing case for the carbon and active chemical. The latter is salamoniac, although this detail varies in different makes. Black oxide of manganese is used as a depolarizer, absorbing the gas bubbles which are formed on the electrodes, when the cell is in action, thereby preventing it from introducing a high resistance. The black oxide of manganese is mixed with granulated carbon, which increases the carbon surface, while a little graphite is sometimes added to insure good conductivity.

In assembling the type of cell shown in Figure 81, the zinc cup, first is lined with porous paper after which the carbon rod is inserted in the middle, and the mixture just described, moistened with a solution of salamoniac, is packed in tightly and evenly so as to nearly fill the cup. The upper edge of the paper lining now is turned down so as to cover the mixture and a paper washer, made to exactly fit the inside of the cup and allow the carbon to protrude, is inserted, thus forming a bottom for the melted pitch or asphalt, which is employed as a sealing compound. A pasteboard covering encloses the complete cell and is used to prevent the zinc cups from getting in contact when several cells are used in close quarters.

The output of a dry cell, also its life for a given output, is dependent on the exposed areas of the zinc and carbon. The larger the area of these parts, the lower the resistance of the cell and consequently a larger current discharge can be

expected. It follows that if the current is used at a small rate the life of the cell will be correspondingly longer. There are several other items which govern the life of the dry cell, one of which can be determined by examination; the thickness of the metal used in the zinc cup. In Figure 81 this thickness is given as .020 of an inch, but some cells go as low as .018 or .014 of an inch. The latter have a much shorter life than the former as the zinc will be eaten through in less time, and thus allow the moisture to dry out of the cell.

The eating through of the zinc cup of a dry cell, not only causes the cell to dry out, but the moisture is absorbed by the outer paste board covering, and if there are adjacent cells in the same circuit an effectual short circuit will be established through the pasteboard coverings. In this way one or more bad cells will destroy the efficiency of a complete set.

Inferior chemicals or cheap grades of zinc and carbon also will cut down the life of dry cells as well as their efficiency. These impurities will cause local action and a gradual deterioration, even when the cells are idle or on the shelf in the storage room. Thus, if the cheap grade of cell is dependent on poor materials, it certainly is a very poor investment.

If this quality of cell uses the best of materials, the low cost can be figured to be due to a thin zinc and a small amount of the expensive materials. In the latter construction the full value is received as the cells will not deteriorate when idle and will give a useful life equivalent to the cost.

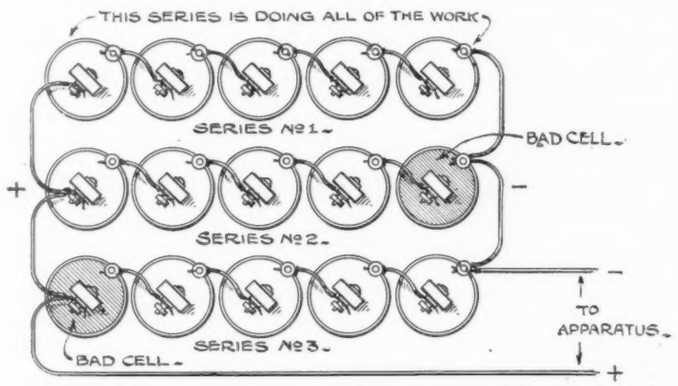


Figure 80—Dry cells arranged in series multiple showing the damaging effect of two bad cells when located in different series. The No. 1 series is doing all of the work and as soon as it is exhausted all of the cells will be discarded. If tested, many of the latter would be found to be good.

The action on the inner zinc surface of a dry cell is seldom uniform, even when the best materials are used, thus we find that the zinc becomes eaten away in spots, the presence of the latter being shown by moist places on the outer paste board coverings of the cells. At least one manufacturer remedies this defect by using a moisture proof fiber casing in place of the usual pasteboard, thereby lengthening the useful life of the cells. In this construction the zinc can be practically consumed before the cell is ready for the scrap heap. Also such a cell can be used in damp places without danger of short circuiting between the cells.

A moisture proof covering can be provided on any standard dry cell by boiling the regular pasteboard covering in paraffine or a mixture of half paraffine and a half beeswax. While such a covering will prevent wetting through and short circuiting the cells, it will not entirely do away with the drying out of the moisture, once the zinc is eaten through in a number of places.

Another cause for deterioration in dry cells is the drying out of the moisture through cracks made in the sealing compound by rough handling. These cracks can be readily repaired by using a hot iron, forcing it down into the cracked portion for at least one quarter of an inch and allowing it to remain a few seconds so as to thoroughly melt the sealing compound.

A large portion of dry cell trouble can be attributed to faulty circuit connections to the cells and sometimes to the binding posts. When the binding post of the carbon electrode is held in place by a screw passing entirely through the same, it oftentimes becomes loose so as to introduce high resistance in the circuit. Therefore, it would be a wise precaution to test all binding posts before the dry cells are installed. More serious troubles can be traced to the actual arrangement of the cells when several are connected in circuit. Figure 82 shows a correct arrangement as well as a more common and faulty one. In the latter the dry cells are located so there is a chance for a short circuit to be established between cells by the overlapping of the binding posts or by means of the loose ends of the connecting wires. In one design of dry cell the zinc cup is dented in where the binding post is located so as to give a safe clearance with adjacent cells, while in another make a pasteboard

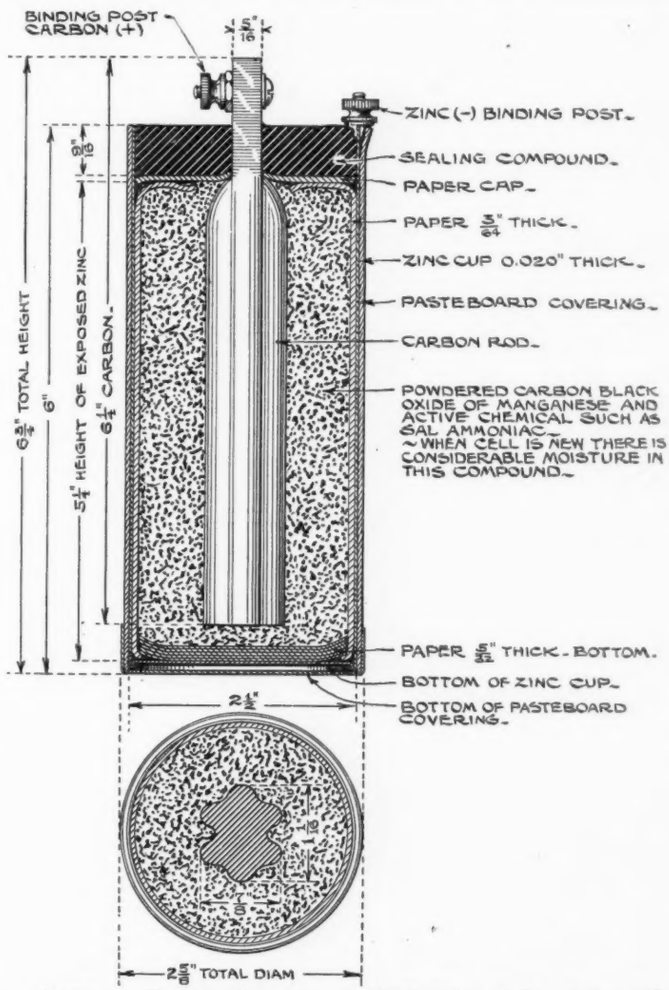

BINDING POST CARBON (+)
5/16"
ZINC (-) BINDING POST.
SEALING COMPOUND.
PAPER CAP.
PAPER 3/64" THICK.
ZINC CUP 0.020" THICK.
PASTEBOARD COVERING.
CARBON ROD.
POWDERED CARBON BLACK OXIDE OF MANGANESE AND ACTIVE CHEMICAL SUCH AS SAL AMMONIAC. ~WHEN CELL IS NEW THERE IS CONSIDERABLE MOISTURE IN THIS COMPOUND.
6 3/4" TOTAL HEIGHT
6"
5 1/4" HEIGHT OF EXPOSED ZINC
6 1/4" CARBON.
3/16"
PAPER 5/32" THICK - BOTTOM.
BOTTOM OF ZINC CUP.
2 1/2"
BOTTOM OF PASTEBOARD COVERING.
2 5/8" TOTAL DIAM

Figure 81—Cross section of a standard make of No. 6 dry cell. This is the accepted telephone size.

covering is used over the entire top of the cell and the binding posts allowed to project through the same.

Most battery makers will supply special spring clips instead of the regular binding posts, when ordered. In some cases these clips are preferable to the ordinary binding posts as they grip the connecting wires tightly and will not loosen their hold when subjected to vibration. However, the same care must be exercised in arranging the cells, as illustrated in Figure 82, so as to prevent short circuiting by having the metal parts overlap and come in contact.

The importance of proper connecting wires for the dry cells, when arranged in series or series-multiple, cannot be over estimated, for one broken wire or projecting end often will put the complete battery out of commission. It is always safe to use large size copper wire for connections, at

least No. 18 B. & S. gauge, provided with a double insulation and waxed, so as to prevent the latter from becoming loose at the ends. A better job is obtained by the use of flexible rubber covered and braided wire, similar to lamp cord, but if the latter is used, it is advisable to solder the fine wire ends together, thus providing a solid portion for secure clamping in the binding posts. When an ordinary wire is used a slight nick made by the knife, when removing the insulation, is sufficient to cause a break at some later time. Not only must care be exercised when removing the insulation from the wire but also in clamping the same in the binding post. Figure 83 shows the right way to do this

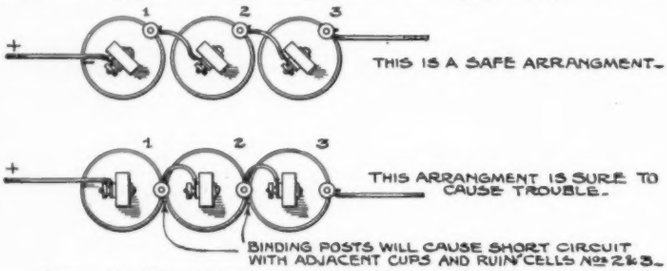


Figure 82—The right and wrong ways to arrange dry cells when wired together. If the terminals are in line there is danger from short circuiting through the zinc cups.

as well as two wrong methods. The wire should be wound around the screw of the binding post, as at *A* so that when the nut is tightened it will tend to keep the free end in place rather than open it as shown at *B*. The insulation of the wire should come close to the binding post and the free end, left projecting after the clamping nut is set, should be cut off.

At *C* in Figure 83 is shown an incorrect and very common method of connecting the wire to a binding post. Here the wire is wound completely around the screw so that the clamping of the nut squeezes the overlapped portions of the wire together, cutting each of them half through. It makes but a small amount of movement to break the wire under these conditions.

There are many designs of special connecting cords, provided with tips soldered to their ends, for connecting together dry cells, but most of these require especial care in arranging the dry cells so as to prevent the exposed metal of the tips from short circuiting the cells. However, when properly installed such cords give a most secure job.

About the only convenient and reliable method for determining the current output of a dry cell is by means of an accurate ammeter, which has a scale reading up to 25 or 30 amperes, connecting the same directly to the terminals of the cell. Such a test, at first thought, seems rather severe but if the ammeter is not left connected more than a few seconds at a time, no great harm will result to the cell. If the ammeter is left in circuit for about five seconds and the current does not drop below the limits ascribed for new and used cells, at the end of such a period, it can be considered that the cell is of full rating or at least good for further use. When a No. 6 size cell is new it should give between fifteen and twenty amperes discharge on short circuit, according to the claims of the makers. Thus fifteen amperes can be taken as the proper rating for a new No. 6 size dry cell. The low limit for indicating the end of the useful life of a cell is more difficult to determine and depends somewhat on the kind of service for which the cell is used. If for operating pole changers it might not be safe to use a cell after its current output becomes less than two amperes when the meter is left connected directly to the terminals of the cell for five seconds. In the case of transmitters a lower value can be safely assumed, but in every event if the pointer of the ammeter goes below the low limit during the five seconds test, it is a clear indication of a poor cell, one which should be immediately discarded and replaced with a fresh cell of full rating.

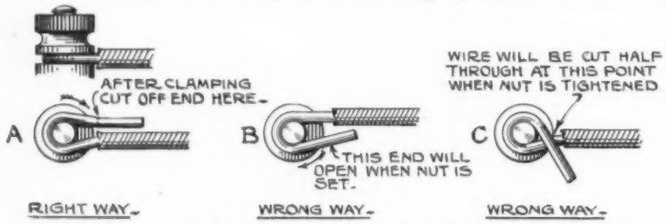

AFTER CLAMPING CUT OFF END HERE.
A
B
C
WIRE WILL BE CUT HALF THROUGH AT THIS POINT WHEN NUT IS TIGHTENED
THIS END WILL OPEN WHEN NUT IS SET.
RIGHT WAY.
WRONG WAY.
WRONG WAY.

Figure 83—The right and wrong ways to fasten a battery connecting wire under the binding post nut.

The ammeter test shows the actual internal condition of the cells, without mathematical calculations, but the significance of the readings should not be overlooked. As the cell becomes dried out and the internal resistance increases, the exposed surface of the zinc is eaten away and less current is generated. These two factors taken together limit the current discharge on an ammeter test and as the effective voltage of the cells depends on these items, it is safe to consider that a cell which will pass the ammeter test just suggested, also will have sufficient pressure to operate the apparatus to which it is connected.

In making an ammeter test the wires used for connecting the binding posts of the meter to the binding posts of the cell should be as short as possible and of very large size,

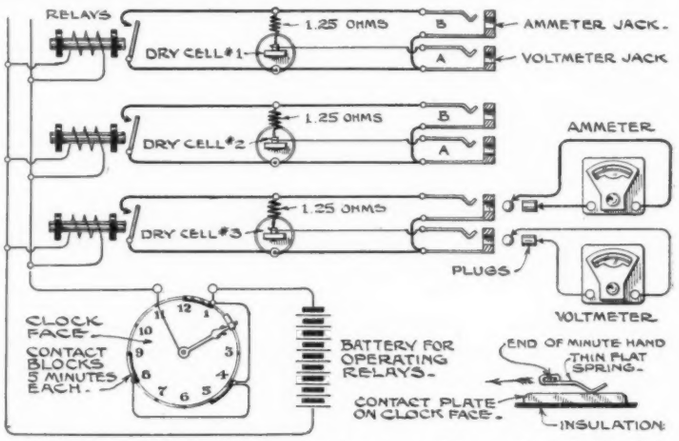


Figure 84—Circuit used in testing dry cells. A clock is used to close the circuits of the cells intermittently through fixed resistances.

say not over two feet of No. 12 copper wire, so that their resistance will not effect the reading materially.

A voltmeter can be used for testing the condition of dry cells but requires more manipulation on the part of the observer. This is partially due to the fact that the open circuit voltage of a dry cell, taken when the cell is idle, gives little indication of its internal condition. In other words, a completely worn out cell (one of high resistance) often will show somewhere near full voltage, while if in circuit and delivering current its voltage would fall to less than one-tenth of a volt. However, if a voltmeter only is available the cells should be tested when actually delivering current to the circuit in which they are used. Thus, if the cells are used in a telephone for furnishing current to a local battery transmitter, the reading of each cell should be at least 75 volts, making a total of 1.5 volts for the two cells which are usually employed and wired in series. This is the low limit for telephone batteries and the cells should be replaced when falling below the same. Now, if the dry cells are used in a pole changer, and it is necessary to maintain a fairly uniform voltage for efficient operation of this device, then a higher value should be taken for the low voltage limit. For example, a multifrequency pole changing set, in which the transformers are designed for twenty-two volts normal, the limits might be twenty to twenty-four volts but never less than eighteen or over twenty-seven volts. These limits give a key to the best test to use on the indi-

vidual cells. If there are eighteen cells in series, each one must show at least one volt when the pole changer is operating, otherwise it is time for the cells to be replaced with fresh ones. Under the same condition of operating, new cells will show about 1.4 volts each, thereby indicating that sixteen cells in series will do the work and that the two extra cells need not be added until the readings of the individual cells fall to about 1.25 volts. It is evident that the adding of extra cells for maintaining the total voltage at about twenty volts cannot be carried farther as the reading of one volt per cell is an indication of the termination of its useful life for this particular service.

Now as to the kinds of measuring instruments to be used for these current and voltage tests. It is needless to say that they must be accurate and constant in order to be of any use. Also the ammeter should be of low resistance and the voltmeter of high resistance. There are several inexpensive, so-called pocket voltmeters and ammeters, also combinations of both, on the market which do very well for dry cell testing. A common fault of these instruments is the lack of permanency of the magnets used in their construction. Their design is such that a loss of magnetism will result in higher readings, which might cause no end of trouble and expense by giving a high rating to poor cells. For this reason it is not safe to economize when purchasing measuring instruments.

It is interesting to call attention to one of the rough methods for testing the condition of dry cells when current measuring instruments are not at hand. A piece of small copper wire, about No. 30 B. & S. gauge and about 12 inches long, is held with its ends in contact with the binding posts of the dry cell to be tested. If the cell is fresh and of full rating the current discharge will be sufficient to heat the wire so that the latter will be too warm to hold in the hand, and will maintain this heat for at least five seconds. An old cell, ready for the scrap heap, will not heat the wire preceptibly, or, if it should make the wire slightly warm, it will not maintain the heat for the five seconds.

When so many minor items, some of which have been mentioned, affect the results obtained from dry cells, it is self evident that a correct test for determining the best make of cell for any given purpose is by means of a so-called laboratory test, where every detail can be watched and recorded. Such tests, to be of commercial value, must approach the actual working conditions for which the cells are to be used, but if time is an object the conditions can

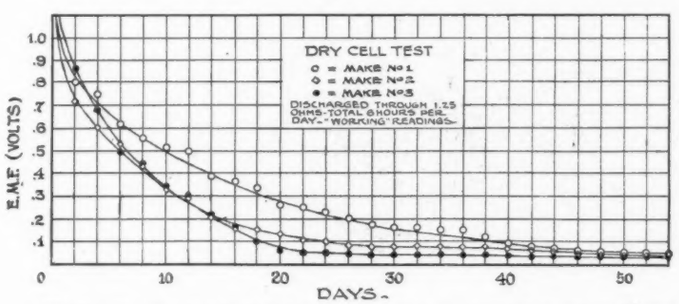

DRY CELL TEST
○ = MAKE No 1
◇ = MAKE No 2
● = MAKE No 3
DISCHARGED THROUGH 1.25 OHMS-TOTAL 6 HOURS PER DAY-"WORKING" READINGS-
E.M.F. (VOLTS)
DAYS.

Figure 85—Curves showing results of heavy current tests on three makes of dry cells. Each cell was discharged through 1.25 ohms, 3 times an hour, 5 minutes each time or a total of 6 hours per day.

be made more severe so as to limit the test to months instead of one or more years.

The apparatus necessary for dry cells test is simple. An inexpensive clock can be converted into an automatic circuit closing device by mounting several insulated brass contact plates around its dial, as shown in Figure 84, and providing the minute hand with a thin flat contact spring made from brass or German silver. The frame of the clock will form one connection to the circuit while a wire soldered to the several contact plates will form the other terminal. The number of contact plates and the length of the same should be made to suit the conditions of the tests, as for example three contacts of five minutes each separated by fifteen minute intervals. This is the arrangement shown in the illustration and has proven to be well suited for testing dry cells which are to be used for telephone and other intermittent services. In order to keep the discharge circuit of each dry cell individual, several relays are used, their contacts being operated by means of the clock and a battery. If the relays are of low resistance their windings can be connected in series, but if wound to 500 ohms or more, a bridging arrangement, such as shown in the illustration is preferable.

The contacts of the relays are arranged to close the discharge circuits of the dry cells through a definite resistance, which latter must be taken to represent actual operating conditions. Figure 84 shows these resistances to be 1.25 ohms

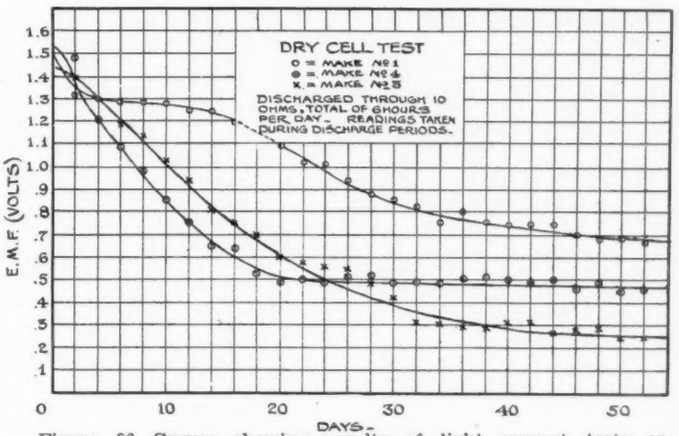

DRY CELL TEST
○ = MAKE No 1
⊕ = MAKE No 4
X = MAKE No 5
DISCHARGED THROUGH 10 OHMS, TOTAL OF 6 HOURS PER DAY - READINGS TAKEN DURING DISCHARGE PERIODS.
E.M.F. (VOLTS)
DAYS.

Figure 86—Curves showing results of light current tests on three makes of dry cells. These tests were made the same as those shown in Figure 85, but 10 ohm resistances were used instead of the 1.25 ohm resistances.

each, which would indicate a condition of heavy discharge such as would be required if one series of cells was used to furnish current for ringing purposes in a pole changer. By changing these test resistances to ten ohms each the circuit will be fitted for making tests on dry cells which are to be used for telephone purposes. This resistance equivalents actual operating conditions as a local battery transmitter averages twenty ohms resistance and is designed for two cells arranged in series.

For simplicity in measuring the voltage and current output of the individual cells, spring jacks are wired in the testing circuit as shown in Figure 84, and the meters are provided with two-conductor cords and plugs. The readings should be taken at least once a day, preferably in the morning, so that the results can be plotted for comparison purposes. As the external resistance of the discharge circuit, used in a test of this sort, remains practically constant, the ammeter jacks *B* and ammeter can be eliminated, provided a reliable low reading voltmeter is available. This will require that the readings be taken when the relay contacts are closed, in other words, when the battery is under load. When making this test, care must be exercised to take the readings after the relay contacts are closed for the same period of time for each cell. If there are only a few cells in the test the clock contact can be observed, and when it has been "made" for almost five minutes and is about to open the circuit, to take the readings as quickly as possible.

Figures 85 and 86 show curves plotted from readings taken under the above conditions. In both of these curves one make of dry cell is shown to be much superior to the other two makes. Without further analysis such results will show which cell is delivering the current, and if this cell holds up mechanically, does not boil over, or eat through the zinc it can be considered a safe investment. The economy, or saving, if any, by using such a cell now can be figured by comparing the first costs of the several cells with their respective outputs.

Little Visits to Big Factories

THE moving of the Monarch Telephone Manufacturing Company into its new building at the corner of Morgan street and Washington boulevard, Chicago, calls to mind the rapid consistent growth of this concern since its founding in May, 1901. The building now occupied is shown in the accompanying illustration and while the picture indicates that the factory is well lighted, yet no illustration can properly show the exceptional conditions as concern light, ventilation, floor space, etc., seen in this factory. The difference between this up-to-date, pleasant and commodious building now occupied by the Monarch company and the portion of one floor first used in the manufacture of telephone ringers is extremely noticeable to those who have been familiar with the company since it started.

Monarch Trade Mark.

In 1901 Ernest E. Yaxley, who had then been in the telephone business for more than ten years, organized the Monarch company and secured the support and practical help of Julius C. Hubacher, who for sometime had been connected with a telephone manufacturing company and for a great many years had been considered a most practical and competent factory superintendent. These two men, with the financial aid of John E. Norling, who had already some investments in the telephone field, started the Monarch company and lost no time in producing a ringer which met with marked success. Without other parts to help out, the ringer alone built up a satisfactory and ever increasing business, as it was immediately adopted by some of the largest telephone manufacturing companies, owing to its efficiency and general simple design. After a little more than six months a second part, a generator, was added to the products of the company and immediately gained the success already secured by the ringer. During the ensuing year of 1902 other parts, including the transmitter, hook switch, induction coil and receiver, were designed and manufactured, but up to January, 1903, but few complete telephones were assembled and sold. Having a line of telephone parts which had been thoroughly tried out and proved satisfactory in other makes of telephones it was only natural that the next step in the development of the Monarch company should be the development of a complete telephone made up in its entirety within the Monarch factory. In deciding upon the general plan of construction, a new idea was brought out and today it is said the Monarch telephone is the only one on the market which is so arranged that the parts within the cabinet can be removed without breaking any soldered connections and without disturbing the permanent wiring. The method of assembling the parts and arranging them in the cabinet soon found favor in the eyes of the telephone operating men, and it was not long until the Monarch complete telephone was well known throughout the country.

New Factory of the Monarch Telephone Manufacturing Company, Chicago.

In January, 1903, Walter H. Trimm, who had been with the Kellogg company for three years, during a period of its most rapid growth, took charge of the sales department. Every effort was then put forth to change the character of the Monarch business from that of furnishing parts to other manufacturers to the more satisfactory business of furnishing complete telephones to the telephone trade. This change was brought about by sincere, consistent advertising and letter writing and at first no traveling salesman was required as those companies having used Monarch parts in other makes of telephones were susceptible of the idea of purchasing Monarch parts in Monarch telephones. However, it was not long until the business in some states required the attention of a traveling man, and in April, 1904, the services of A. J. Carter were secured. Mr. Carter had

been engaged in the operating field for a number of years in various towns in Iowa and he soon worked up an extremely profitable businsss in that state.

From that time until the present date the Monarch company has continued its growth and it now has three other salesmen covering the northern states. R. C. Stone, a telephone engineer of prominence, is taking care of the business in Indiana, Michigan and eastern Illinois. T. L. Dunlap, a man who has spent practically all of his life in telephone, electric light and street railway work, was taken from the operating field in February, 1905, and since then has been employed by the Monarch company to cover the territory south and southwest of Kansas City. In September, 1907, M. E. Hall, another operating man, was engaged to take care of the rapidly increasing business in the states of North and South Dakota.

For more than three years the company has been enjoying a large business from the southwest and especially from the state of Texas. After first selling its equipment through some of the best supply houses in Texas it started a branch house in Dallas in May, 1907. D. C. Lingo, who has represented one or two other manufacturing companies in the southwest for several years and prior to that time was connected in other ways with the telephone movement, is in charge of the branch house and is assisted by Mr. Taylor, formerly of Michigan City, Indiana. The branch has greatly exceeded expectations since it was started, and should prove most beneficial on account of its central location and the facilities it affords for making prompt shipments to the companies in its territory.

Monarch Branch Warehouse, Dallas.

As the Monarch company has grown from a very small beginning it has increased its various departments until today the office and factory are well organized and work along definite systematic lines. Mr. Yaxley remains the general manager and treasurer of the company, while Mr. Trimm, who secured an interest in the company in August, 1906, is secretary and sales manager. He is ably assisted in the sales department by Lyman Q. Trumbull, H. E. Duncombe and S. H. Austin. The credit department is in charge of E. W. Camp, while F. O. Markham is head accountant. G. C. Fricke, who has been associated with various telephone manufacturing companies for the past ten years, is purchasing agent, while his brother, W. A. Fricke, who has spent a great many years in the engineering departments of different concerns, is chief engineer for the Monarch company.

The factory is under the direct supervision of Mr. Hubacher, who is vice president of the company, and the facts of his being financially and therefore vitally interested in the concern and of his exceptional qualifications, undoubtedly are largely accountable for the workmanship seen in the product of the company. Mr. Hubacher is assisted by Ernest A. Schneider, one of the company's first employes.

In the new factory the stock rooms form an important feature of the factory system and George Montony, who is in charge, handles the work in an experienced manner. The packing and shipping rooms located on the same floor with the main stock room are in charge of Nic Keuth. The main machinery floor where most of the metal parts are made is under the supervision of Ernest Leschorn, an expert mechanic. Mr. Leschorn is assisted by Mr. Stevenson.

The fourth floor of the factory building is occupied jointly by the telephone assembling department in charge of Edward Watry, and the department assembling the smaller parts such as transmitters, receivers, hook switches, etc. This department is in charge of Frank Reed, who, like Mr. Schneider, was one of the first employes of the company. The top floor of the building is given up almost entirely to the switchboard department, although the front portion of the floor is occupied by the armature and coil winding department. In the switchboard room August Steinke, who has been with the company for the past two and one half years, and before that was engaged continually for a period of eight years by another manufacturing concern, looks after the construction of the switchboards and the assembly of the parts used in them. Mr. Steinke's experience and his natural ability to produce neat and careful work are seen in the product of this department. Miss McCarron is in charge of the thirty or forty girls composing the winding room, and like the heads of the other departments in the factory is experienced and fully competent to manage this part of the work.

Although the Monarch factory is not as large as the buildings occupied by a few of the other manufacturing companies, it is well worth a few hours time to visit this well appointed, well lighted and well equipped plant. It is the desire of the members of the company to keep the business at a point where personal touch and supervision is not lost. Notwithstanding the rapid and constant growth, at no time has the business in any department or as a whole gotten too large for the personal supervision of the men interested.

It is the policy of the company to manufacture apparatus of the highest grade for Independent operating companies, and to make prompt shipments of all orders received. Prospective purchasers of telephone equipment are requested to write for illustrated descriptions and price on the company's complete line of apparatus.

Telephone men coming to Chicago are requested to call and inspect the new Monarch factory.

TELEPHONE SECURITIES UNSHAKEN.

DURING times of financial stringency the strongest concerns in most lines find it necessary to retrench. Diminishing business marks most lines of trade, but from various parts of the country come reports that established Independent telephone companies are enjoying unchanged prosperity. The following from the Toledo Journal is a sample of these reports:

"It is a somewhat significant and interesting fact that the Independent telephone companies not only in Toledo but throughout Ohio, Indiana and Michigan, controlled by the Brailey syndicate, have already arranged for the payment of the January dividend on both bonds and stocks. The Toledo Home, the Cuyahoga and the Indianapolis companies, as well as the United States Long Distance, have already money in the bank to pay the dividends in January. Under these circumstances, it is not singular that telephone securities generally stood right up to the rack during the slumping process of the past three months. It is strange but true that the harder the times, the higher are the earnings of telephone companies."

TESTS OF INSULATOR PINS

Results of Experiments Made at the West Virginia University for the Ohio Valley Bending Company

SEVERAL requests have been made for the complete report of the tests made by the West Virginia University of insulated pins and wood preservers manufactured by the Ohio Valley Bending Company, of Parkersburg, West Virginia. A brief extract of this report was printed in the November issue of TELEPHONY, and the full text is given below in response to inquiries:

The pins tested were received in two consignments from the Ohio Valley Bending Company, Parkersburg, West Virginia The first shipment consisted of fifty-six one and one-eighth inch shank pins of about equal numbers of hickory, elm, locust, beech and oak; also a number of pieces of stock about one and three-quarter inches square of the same woods. A part of this shipment was tested for the strength of the pins without further seasoning and without any special treatment. The specimens remaining have not been tested.

The second consignment consisted of one hundred one and one-eighth inch shank and seventy-five one and one-quarter inch shank hickory pins. These pins were thoroughly seasoned in a dry kiln and then treated with the various preservatives as explained below.

TABLE 1.—TRANSVERSE TESTS OF INSULATOR PINS

Number of Specimen.	Kind of Wood.	Distance from shoulder of pin to groove inches, L.	Breaking Load. W.	Maximum moment of forces L. X. W.	Remarks.
1	Hickory.	3	2405	7215	Dark.
2	Hickory.	2⅜	1749	4150	Medium.
4	Hickory.	2⅜	2262	5370	Light.
8	Hickory.	2⅜	2150	5100	Dark.
Average.	Hickory.			5459	
10	Elm.	2⅜	1360	3230	
11	Elm.	2⅜	1460	3468	
12	Elm.	2-5/16	1193	2760	
13	Elm.	2⅜	1193	2840	
14	Elm.	2-5/16	1330	3100	
20	Elm.	2⅜	1315	3120	
Average.	Elm.			3103	
21	Locust.	2⅜	1720	4210	
22	Locust.	2½	1782	4460	
23	Locust.	2⅜	1915	4550	
24	Locust.	2⅜	3340	7940	
25	Locust.	2⅜	2310	5480	
Average.	Locust.			5328	
31	Beech.	2½	1955	4890	
32	Beech.	2⅜	1614	3830	
33	Beech.	2-7/16	1614	3840	
35	Beech.	2⅜	1800	4280	
36	Beech.	2-5/16	2600	6020	
37	Beech.	2⅜	1836	4360	
Average.	Beech.			4537	
43	Oak.	2-9/16	1150	2850	
45	Oak.	2½	1849	4640	
50	Oak.	2-7/16	1746	4260	
52	Oak.	2-5/16	1020	2330	Very Brash.
Average.	Oak.			3520	

The results of the various tests are included under the following heads:

1. Transverse tests of insulator pins, Table 1.
2. Flexure tests of stock sizes of various woods, Table 2.
3. Test to determine the amount of various preservatives absorbed by the pins with different methods of treatment, Table 3.
4. Test to determine the amount of water absorbed and retained by pins that have been treated, Table 4.

1. TRANSVERSE TESTS OF INSULATOR PINS.

In making these tests the pins were subjected to a stress similar to that which they have to sustain in actual service. In this case a block of hard wood was substituted for the crossarm, the pin driven in a hole in the block and an ordinary glass insulator screwed in place. The block was then clamped on the moving head of a testing machine and the load was applied by means of a wire looped around the insulator pin and attached to the fixed head of the machine. Care was taken in every case that the pull should be exactly at right angles to the pin. The results are given in Table 1.

It was found impracticable to calculate the actual fiber stresses on material and as a basis of comparison the breaking moment was substituted. Owing to the influence of the shoulder of the pin the stresses calculated by means of the ordinary cantilever formula gave absurd results. In making the test different insulators were used and even when the same insulator was used it would not always screw down the same distance on the pin. This accounts for the fact that the distance from the shoulder of the pin to the center of the groove is variable. To find the breaking load with any other type of insulator it is only necessary to find the length from the shoulder of the pin to the center of the groove of the insulator and divide this into the average breaking moment. The safe load can be found by dividing the result by whatever factor of safety is desired.

2. FLEXURE TESTS OF STOCK SIZES OF VARIOUS WOODS.

These specimens were tested as simple beams and the stresses calculated by the ordinary beam formula. The average of the number of tests of each material would probably give an average somewhat different from the results of single specimens, but the results given may be considered fairly indicative of the samples sent. The results are given in Table 2.

TABLE 2.—RESULTS OF FLEXURE TESTS.

Number of Specimen.	Kind of wood.	Section B X D	Length between supports.	Breaking load.	Maximum fiber stress.
1	Beech.	1-13/16 sq.	7	6580	11500
2	Locust.	1¾ sq.	7	9280	18200
3	Maple.	1¾x1⅝	7	8270	17720
4	Oak.	1¾x1⅝	7	3300	7070
5	Hickory.	1¾x1⅝	7	9330	20000
6.	Elm.	1⅞ sq.	7	6400	10180

3. TEST TO DETERMINE THE AMOUNT OF VARIOUS PRESERVATIVES ABSORBED BY THE PINS WITH DIFFERENT METHODS OF TREATMENT.

The preservatives used in these tests were paraffin, creosote, linseed oil, light crude oil and carbolineum. With the exception of the carbolineum the treatment was the same in each case. The pins were placed in an open vat and boiled or soaked as indicated in the table. In making the boiling tests the fire was started at 11:30, June 13th, and the heat so regulated that the temperature of above 212 degrees was reached about 1:30 p. m., and the temperature was then maintained at from 212 to 270 degrees. The fire was shut off at 5:30 p. m., June 13th, and started again at 7:30, June 14th, the temperature of the preservative reaching 212 degrees about 9 o'clock. The fires were turned down at 3 p. m., June 14th, and turned off of all the vats except that of the paraffin at 5 p. m. Just enough fire was maintained under the paraffin vat to keep it melted during the night of June 14th. All specimens were removed

from the vats at 9:30, June 15th, and placed on a board until June 18th, when they were weighed. In the soaking tests the pins were placed in the liquid preservatives and removed at the same time as the specimens which were treated by boiling, but no heat was applied.

The tests made with carbolineum were carried out according to the specifications of the representative of the company supplying the liquid, namely, to immerse the pins for ten minutes in the liquid at about 212 degrees. The actual temperature of the liquid was 218 degrees.

TABLE 3.—TEST TO DETERMINE THE AMOUNT OF PRESERVATIVE TAKEN UP BY HICKORY PINS.

Pin Nos.	Preservative.	Treatment.	Time.	Initial Weight Grams.	Final weight June 18.	Gain.	Gain %.
		1⅛" Pins.					
H 1-12	Paraffin.	Boiled.	10 hrs.	1397	1635	238	17
H 13-24	Cresote.	Boiled.	10 hrs.	1305	1705	400	30.7
H 25-36	Cresote.	Soaked.	48 hrs.	1365	1487	122	9
H 37-48	Linseed Oil.	Boiled.	10 hrs.	1432	1740	308	21.5
H 49-60	Linseed Oil.	Soaked.	48 hrs.	1415	1432	7	Dbtfl.
H 61-72	Crude Oil.	Boiled.	10 hrs.	1387	1701	314	22.7
H 73-84	Crude Oil.	Soaked.	48 hrs.	1322	1402	80	6
H 85-87	Carbolinium.	Boiled.	10 min.	331	341	10	3
		1¼" Pins.					
P 1-9	Paraffin.	Boiled.	10 hrs.	1359	1682	323	23.4
P 10-18	Cresote.	Boiled.	10 hrs.	1422	1783	361	25.3
P 19-27	Cresote.	Soaked.	48 hrs.	1382	1493	111	8.3
P 28-36	Linseed Oil.	Boiled.	10 hrs.	1432	1772	340	23.7
P 37-45	Linseed Oil.	Soaked.	48 hrs.	1495	1590	95	6.4
P 46-54	Crude Oil.	Boiled.	10 hrs.	1417	1735	318	22.2
P 64-66	Carbolinium.	Boiled.	10 min.	503	511	6	1.2

It may be noted here that the creosote and carbolineum evaporated quite freely, especially the latter. The loss in either case by evaporation was more in my judgment than the amount of the preservative taken up by the wood. This suggests closed tanks.

An examination of selected pins after treatment showed that the penetration of the preservative had been thorough with all boiler specimens with the exception of those treated with the carbolineum. The penetration in this case being scarcely noticeable at all. The penetration with the various soaking tests extended only slightly beneath the surface.

TABLE 4.—SHOWING AMOUNT OF WATER ABSORBED AND RETAINED BY HICKORY PINS WITH VARIOUS TREATMENTS.

Pins Nos.	Preservative.	Treatment.	Weight after treatment. Grams.	Weight after soaking in water 24 hrs. Grams.	Weight water absorbed. Grams	Per cent water absorbed. Grams.	Weight after drying 48 hours. Grams	Weight water retained. Grams.	Per cent water retained. Grams.
H 90&97.	None.	None.	248	277	29	11.8	259	11	4.44
P 71&73.	None.	None.	346	385	39	11.3	367	21	6.07
H 8&10.	Paraf.	Boil.	283	294	11	3.9	289	6	2.12
P 4&6.	Paraf.	Boil.	380	396	16	4.05	390	10	2.63
H 14&16.	Creos.	Boil.	303	316	13	4.3	305	2	.66
P 18&15.	Creos.	Boil.	393	410	17	4.33	400	7	1.78
H 33&36.	Creos.	Soak.	264	291	27	10.2	277	13	4.92
P 21&22.	Creos.	Soak.	327	358	31	9.5	345	18	5.51
H 41&43.	Lins. Oil.	Boil.	281	294	13	4.63	287	6	2.14
P 29&30.	Lins. Oil.	Boil.	395	412	17	4.22	403	8	2.02
H 49&53.	Lins. Oil.	Soak.	240	261	21	8.75	248	8	3.33
P 45&38.	Lins. Oil.	Soak.	380	109	29	7.63	396	16	4.21
H 85&86.	Carbol.	Boil.	236	262	26	11.00	247	11	4.66
P 64&65.	Carbol.	Boil.	350	380	30	8.57	366	16	4.57
H 62&66.	Crude Oil.	Boil.	283	296	13	4.6	289	6	2.12
P 53&47.	Crude Oil.	Boil.	380	398	18	4.75	387	7	1.84
H 80&81.	Crude Oil.	Soak.	237	261	24	10.12	247	10	4.22
P 59&60.	Crude Oil.	Soak.	320	350	30	9.38	335	15	4.70

4. TEST TO DETERMINE THE AMOUNT OF WATER ABSORBED AND RETAINED BY PINS THAT HAVE BEEN TREATED.

In making these tests the treated pins were allowed to dry from the time they were taken out of the vats, June 15th, to June 26th, at a temperature of about 70 degrees. Two pins by each treatment were then selected, one light and one dark, and soaked for twenty-four hours, and the amount of water taken up noted. The pins were then allowed to dry for forty-eight hours and weighed again in order to determine how much water had been retained. The tests show that there was very little difference in the amount of water absorbed by the boiled specimens for the different methods of treatment, but the amount of water retained was decidedly less for the specimens boiled in creosote. This indicates that the penetration of the creosote was more perfect than with other methods of treatment and that the water absorbed was mainly near the surface.

The absorption tests further show that there is very little gain so far as the amount of water taken up by the pins is concerned by merely soaking the pins in a preservative at ordinary temperature. The amount of water absorbed is only slightly less than that by the untreated pins and the water retained by the treated specimens is almost as great as that by the untreated specimens. This, of course, does not take into consideration the effect of the treatment as a germicide.

A. C. LINDEMUTH.

UNDER the title of "Men of Affairs," the Palladium and Sun-Telegram of Richmond, Indiana, published a caricature of A. C. Lindermuth, president of the Richmond Home Telephone Company. Mr. Lindemuth is one of the leading attorneys of Richmond and president of the Richmond Home Telephone Company, as well as president of the Indiana Independent Telephone Association. He is widely known in telephone circles and is prominent in Indiana politics.

A. C. Lindemuth.

Chicago druggists are wailing because the new ordinance recently obtained by the local Bell license will cost them $20,000 more a year.

THE CHICAGO ELECTRICAL SHOW

A Notable Combination of Electrical and Telephone Events at the Coliseum, January 13-25

THE Electrical Trades Exposition, which opens at the Coliseum, Chicago, January 13, continuing two weeks, promises to be the greatest show of the kind ever given in the United States, or, in fact, the world. For two weeks—January 13-25—the great building will be a scene of electrical splendor, the illumination scheme planned being more elaborate than anything ever before attempted. In connection with the electrical show, and giving it a new interest, will be held the annual convention of the International Independent Telephone Association, which will bring to the exposition many telephone men from all parts of the United States and Canada who otherwise would not be in attendance. The convention will hold sessions in the Coliseum Annex January 21, 22 and 23. Detailed information regarding the meeting will be found on another page of this issue.

All the prominent electrical companies will exhibit their products at the electrical show, and the array will include all of the new devices and improvements that are constantly being developed by the progressive men of the trade. Visitors at the exposition in the past have found an inspection of the exhibit a liberal education and the display this year will eclipse all records.

The Electrical Trades' Exposition was organized in the fall of 1905 by a number of Chicago men directly interested in electrical development for the purpose of holding annual exhibitions of the product of electrical manufacturers assembled together under one roof for the purpose of advancing the electrical trade in all of its branches. The company includes in its personnel many of the leading electrical men in Chicago and the middle west.

The primary object of the electrical show is to enlarge and build up the electrical trade in all its branches, to maintain Chicago's position as the electrical center of the United States, to provide a medium for the display of the new developments and advancements of the art, to familiarize the trade and the public with the countless appliances, apparatus and machines producing or utilizing electricity for the daily needs of mankind, to furnish publicity of the most valuable kind, and, finally, to bring the buyer direct to the seller, to their mutual profit. Beginning as a Chicago enterprise, handled by electrical men for the benefit of the industries represented in Chicago, the first show demonstrated that its scope was national instead of local and that it reached to all parts of the country, both in the exhibitors represented and in the attendance of men in the trade.

The first show was held in the Coliseum building, in January, 1906, and was pronounced a record breaker as a trade exposition. Its success was immediate and convincing. In point of interest, attendance, educational value, publicity and direct, as well as indirect, results to exhibitors, its success was pronounced. Most of the exhibitors in the first show and many new concerns exhibited at the second show in January, 1907. The second show excelled the first, both in the number and character of exhibits and in its success from the standpoint of exhibitors.

The 1908 show promises to surpass both of its predecessors. Following a new policy, Electrical Trades Exposition Company will provide a uniformly designed booth for all exhibitors and furnish everything that is required, except the exhibit itself. The design of these booths was carefully

worked out by D. H. Burnham & Company, architects, who have also designed an elaborate scheme of decorations and decorative lighting which will provide a setting for the exhibits that will greatly add to the effectiveness of the individual exhibits and the show as a whole.

The exposition idea has grown rapidly and is a permanent institution, having proved the value of this form of publicity to manufacturers and sellers of electrical devices. It brings the buyer and the seller together, where the various products of the art may be seen to the best advantage. It gives impetus to the production and sale of electrical machinery and apparatus of every kind and is an important factor in educating the public, as well as the trade in the many uses and conveniences of electricity and electrical devices in every day life.

It is impossible to give a complete list of things that will be exhibited at the third annual show, but it may be stated that practically every line of electrical manufacture, as well as the allied lines, from the humble conduit buried in the ground to the wireless waves that traverse the air, will be shown in all the diverse and interesting forms. The exhibitors found on the official list are:

American Conduit Company, Chicago; American Automatic Telephone Company, Rochester, N. Y.; American Clock Company, Chicago; American Electric Fuse Company, Muskegon, Mich.; American Electric Novelty & Manufacturing Company, Chicago; American Electric Telephone Company, Chicago; American Steel & Wire Company, Chicago; American Telephone Journal, New York; Anderson, A. & J. Manufacturing Company, Chicago; Alexander, F. Manufacturing Company, New York; Appleton Electric Company, Chicago; Auto Igniter Company, New York; Automatic Electric Company, Chicago; Austin, M. B. & Company, Chicago; Barnard, B. S. & Company, New York; Bates Manufacturing Company, Chicago; Benjamin Electric Manufacturing Company, Chicago; Big "4" Manufacturing Company, Chicago; Bristol Company, Chicago; Central Telephone & Electric Company, St. Louis; Central Electric Company, Chicago; Century Telephone Construction Company, Buffalo; Chicago Lamp & Reflector Company, Chicago; Chicago Telephone Supply Company, Elkhart, Ind.; Chicago Fuse Wire & Manufacturing Company, Chicago; Chicago Telephone Company, Chicago; Cook, Frank B., Chicago; Chicago Pneumatic Tool Company, Chicago; Commonwealth Edison Company, Chicago; Couch, S. H. Company, Chicago; Crane Company, Chicago; Cullerton, John F., Chicago; Crescent Company, Valparaiso, Ind.; Colonial Art Glass Company, Chicago; Dean Electric Company, Elyria, Ohio; Dixon, Joseph, Crucible Company, Chicago; Dossert & Company, New York; Duplex Metals Company, New York; Electrical Appliance Company, Chicago; Electrician Publishing Company, Chicago; Electrical Review, New York; Electrical Storage Battery Company, Chicago; Electrical World, New York; Electrocraft Publishing Company, Detroit; Einstein, A. O., Chicago; Electrical Record, Chicago; Erwin & Company, Chicago; Electric City Publishing Company, Chicago; Federal Electric Company, Chicago; Ft. Wayne Electric Works, Ft. Wayne, Ind.; General Compressed Air & Vacuum Machinery Company, Chicago; General Electric Company, Chicago; Grothwell, A., New York; Haverstick, Dr. G. W., St. Louis; International Correspondence Schools, Chicago; International Telephone Manufacturing Company, Chicago; Illinois Electric Renovator Sales Company, Chicago; Jewell Electrical Instrument Company, Chicago; H. W. Johns-Manville Company, Chicago; Kellogg Switchboard & Supply Company, Chicago; Klein, Mathias & Son, Chicago; Lang, J., Electric Company, Chicago; Lindstrom-Smith Company, Chicago; Manhattan Electrical Supply Company, Chicago; Manufacturers' Record, Chicago; Matthews, W. N. & Bro., St. Louis; Moline Incandescent Lamp Co., Moline, Ill.; Monarch Electric & Wire Company, Chicago; Monarch Telephone Manufacturing Company, Chicago; McDowell-Stocker Company, Chicago; McRoy Clay Works, Chicago; Moon Vibrator Company, Chicago; National Electric Lamp Association, Cleveland; North Electric Company, Cleveland; Nungesser Electric Battery Company, Cleveland; North Shore Electric Company, Chicago; Pardee, F. W., Chicago; Phoenix Glass Company, Chicago; Roebling, John A., Sons Company, Chicago; Roth Bros. & Company, Chicago; Robbins & Myers Company, Springfield, Ohio; Simplex Electric Heating Company, Chicago; Shelton Electric Company, Chicago; Solar Electric Company, Chicago; Sterling Electric Company, LaFayette, Ind.; Stolz Electrophone Company, Chicago; Stromberg-Carlson Telephone Manufacturing Company, Chicago; Swedish-American Telephone Company, Chicago; Swedish Electric Vibrator Company, Chicago; TELEPHONY Publishing Company, Chicago; United Clock Company, Chicago; Universal Manufacturing Company, Chicago; United States Conduit & Construction Company, St. Louis; Vivax Storage Battery Company, Chicago; Vote-Berger Company, La Crosse; Wagner Electric Manufacturing Company, St. Louis; Western Electric Company, Chicago.

VERMONT-NEW HAMPSHIRE CONVENTION.

THE sixth annual convention of the Vermont and New Hampshire Independent Telephone Association will be held at the Pemigewasset House, Plymouth, New Hampshire, January 14 and 15. Lena M. Owen, the secretary, reports that the following program will be followed:

TUESDAY, JANUARY 14.

Convention called to order at 1 o'clock p. m.

Opening Address—H. W. Buchanan, President Vermont and New Hampshire Independent Telephone Association.

"The Future of the Telephone Business"—E. B. Seeley, Boston, Mass.

"Harmony Among Independent Companies"—Dr. O. D. Eastman, Woodsville, N. H.

"Under Ground Construction"—Herbert L. Moor, Barton Landing, Vt.

"The Conqueror"—John P. Pickett, Bradford, Vt.

"My Vermont and New Hampshire Independent Telephone Friends"—S. H. Couch, Boston, Mass.

"How Best to Meet Competition"—W. E. Kinsman, Heath, Mass.

There will be instructive and interesting talks by other members of the association and also representatives of the following manufacturers will give us some valuable information: Pettingell-Andrews Company, Boston, Mass.; Stuart-Howland Company, Boston, Mass.; L. M. Ericsson Telephone Manufacturing Company, Buffalo, N. Y.; M. E. Crow Electric Company, Worcester, Mass.; C. S. Knowles, Boston, Mass.; Holtzer Cabot Electric Company, Brookline, Mass.; Century Telephone Construction Company, Buffalo, N. Y.; American Steel & Wire Company, Worcester, Mass.; The Stromberg-Carleson Telephone Manufacturing Company, Rochester, N. Y.; Standard Under Ground Cable Company, New York, N. Y.

Reading by Miss Ethel C. Wheeler, Instructor of Elocution, New Hampshire State Normal School.

6:00 p. m.—Concert by Beal's Orchestra.

7 p. m.—Banquet.

Reading by Miss Wheeler.

Address by Paul Latzke, of New York.

WEDNESDAY, JANUARY 15, 1908.

9:00 a. m.—Election of officers.

Report of toll line committee.

Discussion—"Shall We Elect a Delegate to Attend the Chicago Convention January 21st, 22nd and 23d?"

Discussion—"What Action Shall We Take in Regard to Purchasing Goods of the Western Electric Company?"

Passing on new amendments to by-laws as given in call to meeting.

Unfinished business.

Adjournment.

The following additions to the by-laws are to be voted on:

"A majority of the executive committee can at any time appoint any member of the association to fill a vacancy which may occur."

"A member of the association can be expelled by a majority vote at any regular or called meeting of the association."

Manufacturer's Department

By W. H. Graffis

SUCCESS OF SOUTHERN EXCHANGE COMPANY.

THE success and growth of the Southern Exchange Company is a matter of unusual interest and is a practical demonstration of what can be obtained by personal, persistent "stick-to-it-ive-ness" and fair dealing.

The company was organized under the laws of the state of North Carolina, with executive and sales office at 97 Warren street, New York City, with the following officers: E. G. Chamberlin, New York, president; A. J. McKinnon, Maxton, North Carolina, vice-president and treasurer; R. M. Williams, Maxton, North Carolina, secretary, and W. E. Mitchell, New York, sales manager.

The personnel of the company is a strong one and at once inspires confidence and assures business execution and honesty of purpose.

Mr. Chamberlin, a native of New Hampshire, has been prominently identified with various railroads of New England as auditor and other important positions in the accounting and passenger departments, and later prominently identified with and representing well known companies of New York in the line now engaged in, needing no introduction to the trade at the entry of this company into the commercial arena. With his frank, genial disposition, he is well known and highly esteemed by all in the trade and every one is confident of a hearty welcome and a kind word, who have any dealings with him. To his exceptional executive ability and untiring energy the unusual success of the company is largely due.

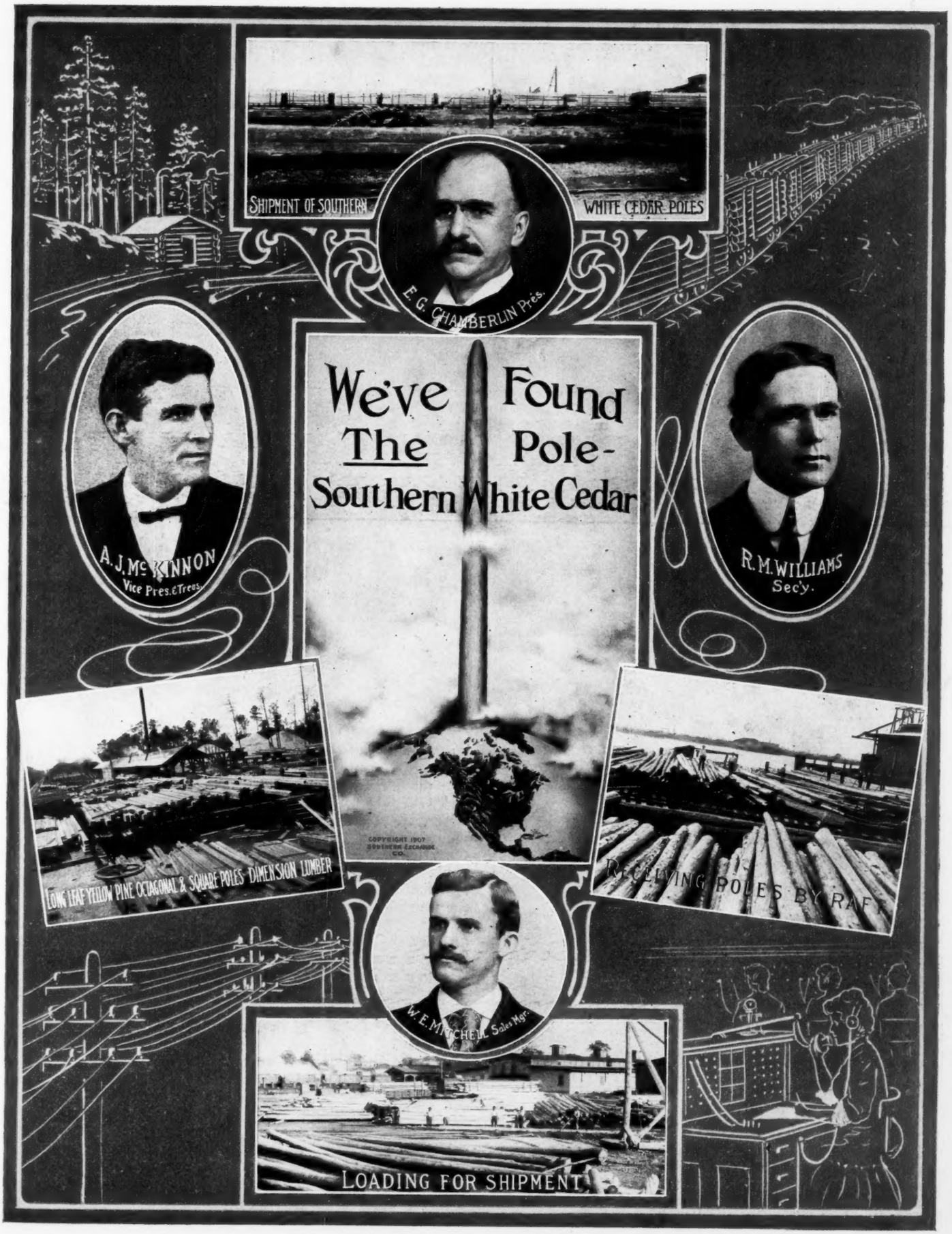
Mr. McKinnon, a native and life-long resident of Maxton, North Carolina, is a typical southern gentleman and is prominently known and very highly esteemed by every one throughout the state of North Carolina, as well as the entire southern states, having risen to positions of power and wealth in spite of the crushing blow and embarrassing circumstances following the Civil War. He is at the present time vice-president of the Southern Cotton Growers' Association, vice-president of the Town Creek Railroad and Lumber Company, president of the Alma Lumber Company, vice-president of the Bank of Maxton, and prominently identified with various other important enterprises throughout his state. The esteem with which he is held can probably best be stated in saying that to be a friend of Mr. McKinnon is to hold an open sesame to all southern society in his state and elsewhere throughout the south.

Mr. Williams, who at present is the mayor of Maxton, is also a native and life-long resident of Maxton, and has always been prominently associated with Mr. McKinnon in his various enterprises and perforce partakes of his persistent effort and integrity of purpose. He is well and prominently known throughout the state of North Carolina.

Mr. Mitchell, a native of New York, with a practical experience of twenty-five years in the lumber trade, in that commercial center of the world, having also a thorough knowledge of the milling branch of the lumber business, is unusually qualified to fill the office of sales manager of this hustling company in a manner that has added materially to the success and prosperity of the company. With a large personal acquaintance, being well known throughout the entire trade, he is held in confidence and high esteem for courteous attention and fair dealing by all doing business with the company.

The Southern Exchange Company has increased the volume of its business fourfold since the incorporation, the year just past being its best year. With mills in North Carolina and Georgia, handling only first-class material, it has built up a business with most desirable companies throughout the country and is able to retain this trade by the company's unswerving principle of fair dealing, in many instances enjoying their business without competition, doing a large export business as well as domestic, having shipped

Long leaf pine cross arm stock Southern Exchange Company, New York.



Officers and views in yards of the Southern Exchange Company, New York.

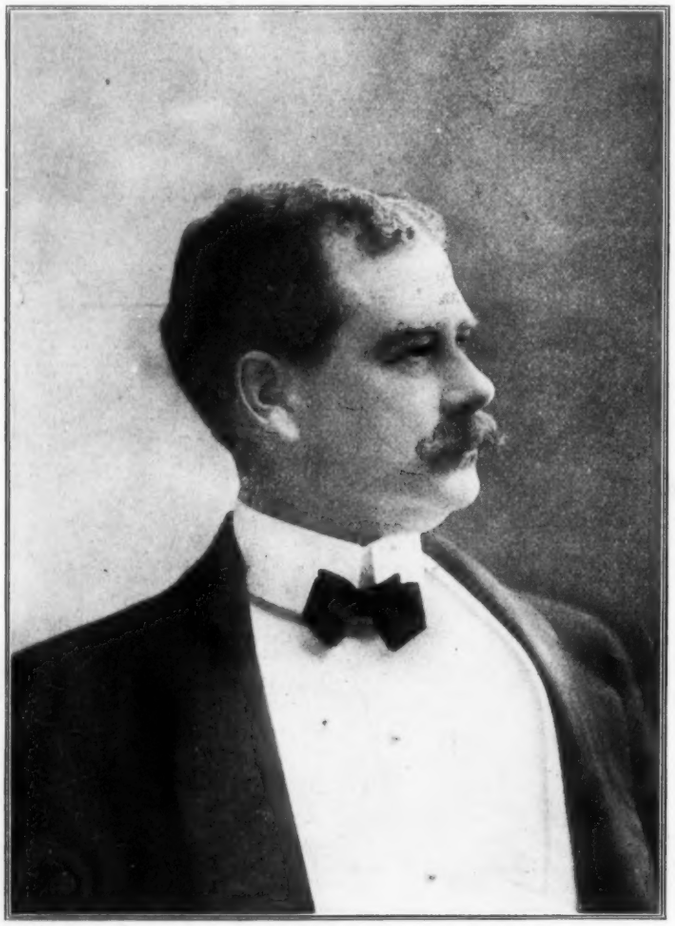
material to Mexico, South America, Argentina, Brazil, Canada, etc., and has recently consummated an arrangement for a personal foreign agent with headquarters at Berlin, Germany.

The company makes a specialty of southern white cedar poles, especially desirable for overhead construction work on account of the natural symmetrical appearance and durability. Sawed yellow pine octagonal and square poles, untreated or creosoted, particularly adapted for city or town work, being absolutely straight and symmetrical as well as durable. Especially high grade long leaf yellow pine crossarms, untreated or creosoted, any size or quantity. Also yellow pine railroad crossties.

The company report very favorable prospects for future business and invites correspondence from prospective purchasers.

A POPULAR NEW PARTNERSHIP FORMED.

AN announcement of more than usual interest to the telephone and electrical fields is that of a partnership just effected between Messrs. B. S. Barnard, of New York city, and Edward F. Kirkpatrick, of Chicago, whereby these two prominent factors in the underground conduit field unite their forces under the firm title of B. S. Barnard & Company. It would be difficult to name two men more widely known or popular in the telephone or electrical field.



B. S. Barnard.

Mr. Barnard's first commercial experience was in the oil business at Yonkers, N. Y., after which he engaged in the hotel business at New York City. In 1878 he was employed as outside salesman for the Bradley & Hubbard Manufacturing Company, of Meriden, Conn., at its New York office, and in 1885 he went into the plumbing business in Beekman street, New York. He was very successful in this venture, securing a larger volume of business than any other salesman in this line during a period of sixteen years. When the underground conduit business began to boom in 1898, Mr. Barnard's services were solicited by the American Vitrified Conduit Company, of New York, which afterwards sold out to the so-called combination of clay manufacturers. This concern was, in its time, the only manufacturer of multiple duct conduits in the east and,

E. F. Kirkpatrick.

largely through the efforts of Mr. Barnard, its volume of business grew to a very gratifying extent. Following the sale of this company, Mr. Barnard, with Mr. Robert W. Lyle, organized the Great Eastern Clay Company, of South River, N. J., of which Mr. Lyle is president and general manager. At this time, the Standard Vitrified Conduit Company, allied with the Great Eastern Clay Company, also was organized with Mr. Barnard as president, and this company stands to-day as one of the foremost in the rank of conduit manufacturers.

In addition to its South River plant, the concern has a number of factories two of which are located in the west. The company's product is generally regarded as high grade, due to the successful supervision of Mr. Lyle, who is an acknowledged expert in the manufacture of clay products. These factories not only afford enormous capacity but exceptional facilities for shipping to all sections of the country promptly.

Besides being an expert business promotor and an all-around good fellow, Mr. Barnard has been very active in the telephone field and is known as a regular attendant at all of the conventions. In addition to this, he served twenty years of his life as lieutenant and captain in two of the leading regiments in New York and received upon his retirement a medal of honor from the governor of New York state. Mr. Barnard is also a member of several prominent New York clubs and is in every way a congenial business associate for his new partner, Mr. Kirkpatrick, who enjoys an equally desirable social standing in Chicago.

Mr. Kirkpatrick has, for the past twenty years, been prominently identified with the electrical business, having gone with the Westinghouse Electric & Manufacturing Company in 1887. He remained with that concern for over ten years, being first connected with its Pittsburg office, and later with its Cincinnati branch, and in 1891 was transferred to its Chicago office. In 1896, he accepted a position with the Fort Wayne Electric Corporation in its Chicago office, and remained with the latter company until the spring of 1899, when he became district manager for the Siemens & Halske Electric Company remaining with them until that concern was absorbed by the General Electric Company. Under the consolidation, Mr. Kirkpatrick was the only salesman of the Siemens & Halske Electric Company retained by the General Electric Company.

In 1901, Mr. Kirkpatrick went with the McRoy Clay Works and remained with that company seven years, or up to the consummation of his present connection.

In the firm of B. S. Barnard & Company, Mr. Kirkpatrick acquires a business interest and becomes its vice president.

Certainly there is, in the entire telephone field, no one better known or more popular than "Kirk." As a successful salesman, manager and advertiser, Mr. Kirkpatrick takes a rank second to none. In his work in the electrical field he held the record for the sale of municipal lighting plants. He also holds the record for securing the largest single order for conduits ever placed—an item of over 400 cars.

Mr. Kirkpatrick is a member of the Chicago Athletic Club and other prominent social organizations of the western metropolis. He will have charge of the Chicago office of the B. S. Barnard Company in rooms 429 and 430 Monadnock block, its eastern office remaining at 39-41 Cortlandt street.

AUTOMATIC ELECTRIC COMPANY'S EXHIBIT.

THE Automatic Electric Company will exhibit at the 1908 Electrical Show a "cross section" of an automatic telephone system, comprising working sections of two interconnecting common battery automatic exchanges of the 100,000 system, designated "B" and "K" respectively. The "B" exchange section consists of a standard 100 line unit and a board of trunking switches. The 100-line unit comprises 100-line switches and 10 connectors and in addition a set of three rotary connectors used in connection with private branch exchanges. The trunking board comprises the standard first, second and third selector switches. The "K" exchange section consists of a regular party line unit accommodating 100 party lines or 400 telephones and trunking switches as in exchange "B." Twelve telephones are connected to the exhibit and calls are made precisely as in the largest working exchange. A toll board, wire chief's desk and private branch exchange are connected to exchange "B" and are operated in conjunction with it.

This exhibit will be located in spaces 5, 6, 13, and 14, Section L, Coliseum Annex and, it is said, will be the largest Independent telephone exhibit at the Electrical Show. The company's representatives will be pleased to demonstrate any or all features of the automatic system to all interested parties who visit the exhibit.

THE MOORE CALENDAR FOR JANUARY.

ALFRED F. MOORE, of Philadelphia, made a big hit last year with his artistic picture calendars for the telephone trade, and it is promised that the coming year will give us something "better still." We are going to give TELEPHONY's readers just a taste of Mr. Moore's treat by reproducing herewith as best we can in plain black and white and using this grade of paper, the study selected for Mr. Moore's January calendar.

Along with this picture goes the following characteristic Moore talk—terse, conservative and to the point:

"Have you noticed the improvement in the calendars for this year?

"The previous issues brought in so many letters of commendation and a volume of business so much in excess of our expectations, that we felt in duty bound to show our appreciation.

"It is a foregone conclusion that you are using cords, weatherproof iron and copper wires and rubber covered telephone wires.

"So why not acknowledge the initial calendar of the 1908

Alfred F. Moore Calendar.

issue with an order or inquiry for what you need now or contemplate using when the spring season opens?

"Ask for free samples.

"A trial will convince you that you have made no mistake."

SWEDISH-AMERICAN INVITATION.

The Swedish-American Telephone Company will be one of the principal exhibitors at the coming Electrical Show, which will be held at the Coliseum, Chicago, January 13-25. Telephone men who have visited the Electrical Show remember the Swedish-American as being a user of large space in display of its popular product. The company's exhibit at the coming show will consist of its well-known line of magneto product; new features are promised and telephone men will do well to visit this company while attending the show.

As evidence of the popularity of Swedish-American equipment, the following named companies and individuals have recently contracted with the company for exchange equipment and telephones: Grant County Telephone Company, Pond Creek, Oklahoma; Citizens' Telephone Company, Arnet, Oklahoma; Whiteside Farmers' Mutual Telephone Company, Morrison, Illinois; Lehigh Coal & Navigation Company, Lansford, Pennsylvania; Elgin Mutual Telephone Company, Elgin, Oklahoma; Gibsonburg Telephone

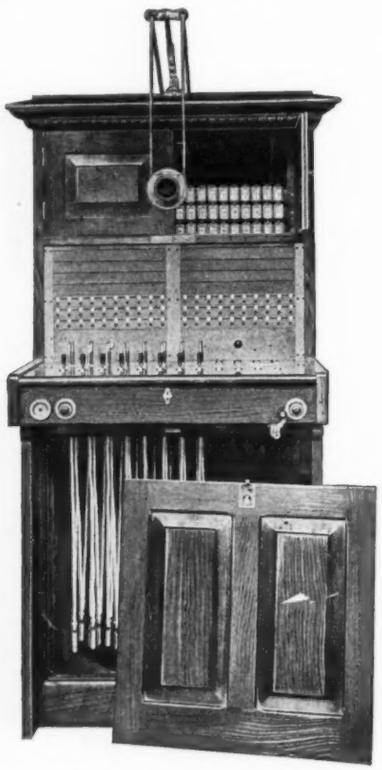
Company, Gibsonburg, Ohio; Home Telephone Company, Kurtz, Indiana; Buffalo County Telephone Company, Gann Valley, South Dakota; Home State Telephone Company, Abercrombie, North Dakota; Tuscumbia Telephone Company, Tuscumbia, Missouri; Athens Telephone Company, Athens, West Virginia, F. D. Parks Telephone Company, Cooperstown, Illinois; J. N. Ragsdale, Faxon, Kentucky, and Dane County Telephone Company, Cottage Grove, Wisconsin.

The Swedish-American company reports that business from its two branch houses is good with prospects for an exceptionally heavy season. The Swedish-American was the first Independent manufacturing company to establish a shipping branch at Kansas City, and operates the only branch in Sioux Falls, South Dakota, placing it in a position to promptly care for the wants of its many customers in the west. This company desires to extend, through the columns of TELEPHONY, a cordial invitation to all Independent telephone men to make their headquarters with the Swedish-American while attending the convention and Electrical Show.

HEINZ'S FIFTY-EIGHTH VARIETY.

FOLLOWING is a description of the new lamp line, central energy, private branch switchboard, recently furnished by the Stromberg-Carlson Telephone Manufacturing Company, for the H. J. Heinz Company, of Pittsburg, Pa., and installed in the latter's office at Allegheny, Pa.

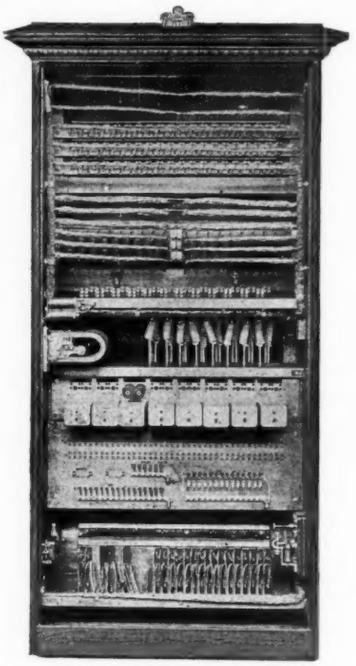
This equipment was placed in a standard A-4583 cabinet of mahogany with a polished dark mahogany finish. In this cabinet the keyshelf is made five-ply to prevent warping and is of the low type, being only thirty-one inches from the floor. This enables the operator to occupy an ordinary chair while operating the board. The plug shelf is covered with



Stromberg-Carlson switchboard, front view.

heavy belt leather to protect it from the impact of the plugs. The front and rear panels are removable, the former being fastened in a frame, thus making a solid construction. Besides above panels, a panel is furnished back of the cords, which, when removed gives access to the wiring of the relays and the rear of the terminal board. Provision was made in the wiring for an ultimate capacity of 120-lamp ended lines and twelve-cord pairs with double lamp supervisory signals. Of these sixty lines and eight-cord pairs are equipped. Besides this equipment, ten plug ended trunks could be furnished should the customer so desire.

Another commendable feature of this apparatus is the location of the line relays, which are placed in the top of the



Stromberg-Carlson switchboard, rear view.

cabinet, where they can be readily inspected from the rear by removing the back panel or from the front by opening the panel door. The cord relays, also accessible from both front and rear, are mounted in the rear of the cabinet, behind the cords. All the lines terminate on the terminal board, located below the cord relays. The condensers are mounted below the terminal board on a shelf which serves as a mounting for the condensers and also leaves a space below for a cable run, in case that in the future the customer should desire an additional section. The operator's cut-in-jack, the night-bell key and the generator-switching key are mounted in the rail below the keyshelf.

PLATINUM PLATE FOR TELEPHONE PURPOSES.

THE Ellwood Ivins process of plating pure platinum on base metals, such as copper, brass, German silver, etc., in either sheets or wire, is attracting considerable attention among manufacturers and engineers of the telephone field. Already this discovery is being extensively employed, and, so far as can be learned, with the greatest success.

Mr. Ivins, who is one of Philadelphia's leading business men and proprietor of the Ellwood Ivins Tube Works, at Oak Lane Station of that city, says: "Our chief business in the telephone field, as you doubtless know, has heretofore been along the line of seamless steel tubing in which we specialize. However, my training along telephone and electrical lines, added to the fact that no one had previously been able to plate successfully with platinum, led me some time ago into a series of experiments and investigations which ultimately proved successful, beyond all expectations. At first, we told only a few of our tube customers about it, and they have been using it now for over a year, no one knows except they, at what saving of dollars. We have never advertised it, possibly because it seemed out of our line, but the orders have kept coming in and we have

decided to carry this henceforth as an adjunct to our business. I need hardly tell you what a platinum disc means to a telephone transmitter. We are selling a lot of them. Some plated on copper, others on German silver. It's the acme of perfection for telephone transmitters. Besides, it costs but a mere fraction of the price manufacturers are now paying for platinum. The results are the same, only the platinum is not so thick. We are producing in sheet, copper, brass, German silver, iron or steel, in fact, almost any metal, plated on one side or both, and on any gauge of base metal. It also is so plated, that no amount of working the plated sheets, nor heat or acid, will in the slightest degree affect it. The same is true of wire, plated on any commercial metal.

"We even plate tool steel with platinum and do it so well that one can heat the steel to a 'tempering heat,' and immerse it in water or oil, to 'draw the temper,' but the platinum will come up as bright and clean as a new silver dollar—and stay there, too. Can you think of a more severe test?

"In brief our platinum plate has all the goodness of platinum, which it, with the characteristics of the base metal, hides and protects."

Telephone manufacturers interested in this new platinum plate can obtain particulars, prices, and samples by addressing Mr. Ivins at Oak Lane, Philadelphia, Pa.

THE MERCURY ARC RECTIFIER IN TELEPHONE WORK.

SINCE the comparatively recent perfection of the mercury arc rectifier for commercial use, its operation has been most extensively confined to automobile work, where it has been found to be one of the simplest and most convenient methods of charging automobile storage batteries.

Figure 1—Front view of rectifier panel for telephone work.

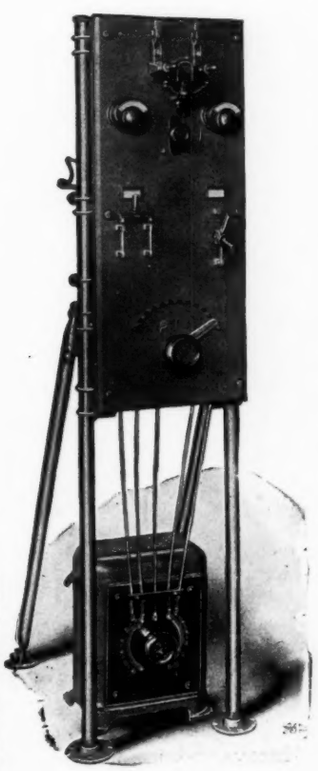


Figure 2—Rear view of rectifier panel for telephone work.

The same reasons which have led to its adoption for this purpose also adapt it to the requirements of telephone battery charging. The comparatively low cost, compactness, and high efficiency of the mercury arc rectifier has created a demand for a charging panel for telephone work, and this has been met by the outfit developed by the General Electric Company of Schenectady, New York.

In Figure 1 is shown a front view of an improved panel for telephone work. To lessen the danger of breakage, the tube has been mounted on the rear of the panel, as will be seen in Figure 2. In this respect it differs somewhat from former types of charging panels. The necessary switches, meters and circuit breakers are mounted on a black enameled slate panel, the whole being compact, neat, and attractive in appearance. This panel occupies a floor space approximately sixteen by eighteen inches and has a height of sixty-four inches. High-grade instruments are supplied, the ammeter having its zero at the center of the scale, so as to read in either direction.

On the rear of the panel may be seen the necessary reactance coils and starting resistances. On the floor beneath the panel proper is located the reactance coil for adjusting the alternating current supply, thereby controlling the direct current.

In addition, the General Electric Company furnishes a suitable reactance which is so designed that it reduces the humming on telephone circuits to a minimum. Tests of this rectifier, made by the American Telephone and Telegraph Company, indicate that there is no noise on the line when the batteries are being charged. This is a point of great importance in the satisfactory operation of any charging device for telephone service. An automatic rocking device for the tube can be supplied where desired, and is particularly useful where fluctuations or momentary interruptions, sufficient to stop the arc, are liable to occur in either the supply or load circuit.

The space required for an installation of these rectifiers is but one-third of that necessary with the ordinary motor-generator equipment, and the efficiency is claimed to be much higher than any other method of transforming alternating current to direct. A large number of these outfits are in successful commercial operation in telephone exchanges, and letters from satisfied purchasers point to the fact that the solution of battery charging troubles in telephone exchanges is found in the mercury arc rectifier.

TELEPOST COMPANY PLANS.

SINCE numerous proposals have been submitted to the Home Telephone Company of Richmond, Ind., by the Telepost Company of New York, which intends to take over all Home telephone lines for use of the New York concern, the new Telepost system is attracting much interest, says the Palladium of that city. The Telepost Company will send telegraph messages over telephone wires without interference with the regular telephone business and do it at a much lower rate than either the Western Union or the Postal Telegraph companies grant. A New York special says of the proposed plans of the Telepost Company:

"In addition to the great economy introduced by the use of its automatic sending and receiving system, the new telegraph company, known as the Telepost, will eliminate all bookkeeping and accounts by the use of 25-cent blanks, 'good' at any Telepost office for a fifty-word message, sent by wire and delivered by mail, or a twenty-five word telegram delivered by messenger in the usual way.

"The blanks to be used have been patented and registered. They will be placed on sale in books of a value of from $2.50 to $25.

"The first rate for telegrams to any distance will be a cent a word; ten additional words, five cents. The prepaid reply system of the Telepost Company includes the delivery with the original message of a reply blank which can be used only for the address of the sender within seventy-two hours."

NEW PAY STATION APPARATUS.

THE Graeber-Entriken Manufacturing Company, of Philadelphia, Pa., has recently perfected a line of pay station apparatus for telephone companies. The company's standard three-slot machine No. 50 and the standard one-slot machine No. 5 connect to bell box by cord and are a combination desk set and pay station. There is no necessity to change the wiring, or the present style of portable desk set installation. It is the new way to install a desk set pay station, saving time, expense and doing away with cross connecting plates, screws, bolts, etc. This set is very compact, having switch hook and cord connections, in a compartment fastened on a side of the machine with quick free access. It is claimed the door is returned and locked in one-tenth the time required to open the old style desk set.

The switch hook incorporated in this compartment is stamped of cold rolled steel and is unbreakable. Each connection is mounted with German silver punchings, while the contact spring is made of German silver. The switch hook has a hard rubber safety pin should the spring break or weaken with constant use, making it impossible to get a ground or shunt on this contact spring. The cord connections are carefully mounted on a hard rubber block with flanges of the same material insulating the punchings and producing a perfect insulation.

The company is at the present time working on two new model counters, one being operated manually and improved so that it will appeal to the telephone engineers rather than the subscriber. This counter is similar to the one now in operation, except that it will be fixed to the stand or wall set so that the subscriber cannot remove it. The person making a call will pull a lever when told by the operator, and the counter will register, and produce a loud clear signal. The subscriber is unable to tamper with the register dials.

The other device is operated electrically by the operator from the exchange. The subscriber sees the dials but has no lever to operate. The company asserts that both of the new model counters will be ready for delivery by January 15, 1908. At a great cost the company states it has brought the "Invincible" register pay station to a stage of perfection without complicated parts. The "Invincibles" are built of cold rolled sheet steel by skilled workmen and are considered to be burglar proof. The registers have been carefully tested and will stand hard usage and are said to be highly indorsed by leading telephone manufacturers and engineers. The registers can be installed on both common battery and magneto system and mounted as a complete telephone desk set or on a wall set as shown in illustration.

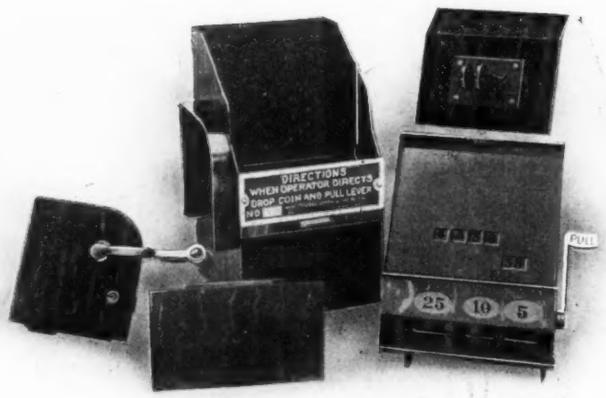
All of the registers used in these pay stations have been designed and built along lines strictly new. The collector has access to money only and is unable to see any portion of the coin mechanism, while the person reading the register has no access to money or coin mechanism, but is able to

"Invincible" No. 5.

"Invincible" No. 150.

"Invincible" standard No. 50.

"Invincible" No. 100.



No. 150 dissembled showing register figures.

"Invincible" No. 25.

read the dials, which show the total amount of money that has passed into the machine. The lever is locked when receiver on the pay station is hung up.

The Graeber-Entriken Manufacturing Company has recently published a catalogue which deals exclusively with

"Invincible" No. 200.

its "Invincible" cash register pay stations, enumerating the merits of the apparatus and which will be sent upon request.

REVOLT AGAINST THE BELL.

THE Adams Basin (New York) Bell telephone subscribers are holding meetings to protest against the Bell's increase in the monthly rentals of telephones. Mr. Flint, of the Inter-Ocean, an Independent company, was present by invitation, and addressed the subscribers, after which a motion to join the Spencerport subscribers in what is known as the Ogden Independent Telephone Company was carried. Nearly $4,000 worth of stock was subscribed for the purpose of building a new exchange. One man present said he had conferred with Mr. Small, of the Bell company and had been informed that the exchange could be purchased of the Bell company. Those present were too indignant to even consider the matter. They feel that they have been imposed on long enough, and will not consent to use "antediluvian telephones" any longer.

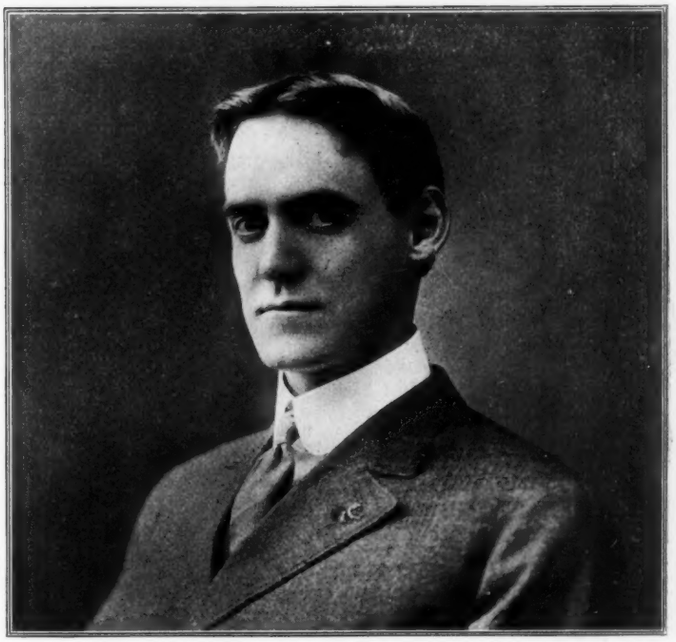
ELECTRIC SOLDERING IRONS FOR TELEPHONE WORK.

IN RESPONSE to inquiries from numerous telephone men who are interested in modern methods and up-to-date appliances for achieving correct work and economy of time and labor, TELEPHONY has in preparation an article on the use of electric soldering irons for telephone work. It is claimed that these irons, which are now coming into general use among the better class of companies, are more convenient, more economical, and more efficient. Particularly is it claimed for them that they afford continuous and uniform heat not otherwise to be procured. This advantage is one which will be appreciated by telephone men and especially by those who have any considerable amount of trouble with soldered connections about their switchboard. Following along this same line of thought, we present in our advertising pages this month the announcement of a Chicago concern—the Vulcan Electric Heating Company, which is the leading manufacturer of this line of goods in the United States. Telephone men who would like further information regarding the product of this concern and the claims made for same should address it at 73-75 W. Jackson boulevard, Chicago, Illinois.

BERNARD C. GROH.

AMONG the well known authorities on the engineering and cost of electrical subway construction is Bernard C. Groh, of the American Conduit Company, who is manager of the Chicago office of that concern. Mr. Groh was born at Grosse Ile, Michigan, February 3, 1877, and received his education at Detroit. He began his telephone experience with the Michigan Telephone Company at Detroit, and was connected with the equipment department of the Erie system under C. L. Boyce, when that company was at its best.

Mr. Groh entered the Independent telephone field as superintendent of equipment of the Interstate Telephone and Telegraph Company of Trenton, New Jersey, in 1901, and later became chief engineer of that company under F. A.



Bernard C. Groh.

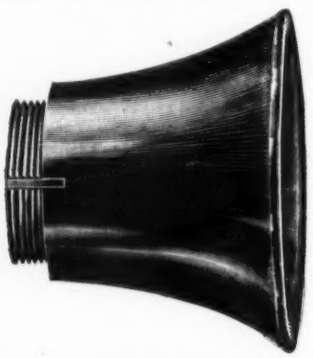
Demarest. He remained with the Interstate Company during its heavy construction period of 1902-1904, when Trenton, Atlantic City and other cities of the state were rebuilt and the connecting toll lines constructed. Mr. Groh went with the American Telephone and Telegraph Company in 1904 and became conduit engineer under Dr. Hammond V. Hayes, at Boston. He also served as field engineer on the New York-New Haven long distance subway. His connection with the American Conduit Company has been most successful, and he is making an enviable record as manager of the Chicago office.

SCRANTON ELECTROID MATERIAL.

THE Scranton Button Company of Scranton, Pa., and the products manufactured of its "Scranton Electroid" material are so well known among the electrical manufacturing trade as to require but little comment. The "Scranton Electroid" material is the result of thirty years' scientific and careful experimenting, and has now attained that degree of perfection it is claimed, that its adaptability to the electrical industry is universally recognized. Its high rep-

utation among electrical manufacturers has been established by many years of satisfactory service. It possesses the highest insulating properties as well as being a non-absorbent of water. It cannot be disintegrated by acids or oils, and withstands normal heat. It is hard, strong and tough and can be moulded into practically any shape, with threads or threaded holes, when required. Metal insets such as screws, stems or plugs may be moulded in position without affecting the properties of the metals.

Articles made of the "Scranton Electroid" material have a high polish, and do not lose color. Economically it is



"Scranton Electroid" mouthpiece.

used as an extensive substitute for rubber-fiber, horn, etc., and in some respects is reputed to be superior to these materials.

"Scranton Electroid" is especially adapted to the manufacture of telephone mouth pieces, receiver shells, crank handles, socket keys, socket rings, bushings, push buttons, etc. Thirty years of constant use and ever increasing demand have demonstrated its worth and wide range of

Desk microphone handle.

"Scranton Electroid" receiver shell.

adaptability. The accompanying illustration shows one of the company's telephone mouth pieces which has finish, strength and mechanical accuracy. The Scranton Button Company is head quarters for this class of goods and is prepared to furnish all standard telephone mouth pieces. Special designs and threads are also made to order.

The desk microphone handle is considered a masterpiece and has been favorably passed on by experts.

The telephone receiver shells manufactured by this company have the approval of telephone manufacturers everywhere. We illustrate herewith one of the standard types.

The Scranton Button Company operates the largest plant of its kind, using especially designed machines and appliances which are protected by patents. The company's extensive die working department is equipped with modern tools operated by the highest class of skilled mechanics. Mechanical accuracy is one of the company's chief aims, and how well it has succeeded may be judged from the fact that during the past five years it has been compelled largely to increase its facilities to keep pace with the demand.

It occupies its own buildings which were planned and erected expressly for the business, and affording a floor space of over 45,000 feet. A new catalogue designed to call attention to the merits and possibilities of the "Scranton Electroid" material may be had of the company upon request, together with all information as to prices, etc.

The officers of the Scranton Button Company are William Connell, president; Charles R. Connell, secretary and treasurer, and Philip L. Sylvester, superintendent.

The Chicago office of the Scranton Button Company is under the management of H. E. Cobb, who has had the handling of the entire western business for the Scranton Button Company for the past three or four years. Any concerns in need of any of the material made by this company through that section are kindly requested to send their inquiries to Mr. Cobb, who has charge of the Chicago office. Mr. Cobb carries a large line of samples of different kinds of material, and the Scranton Button Company will be pleased to have its customers, when in need of electroid, to call at his office and see the samples. Mr. Cobb will be pleased to quote them prices and give them any information they may desire.

AUTOMATIC COMPANIES MERGED.

REGARDING the merger of the Strowger Automatic Telephone Company and the Automatic Electric Company, the directors of both corporations have issued a circular to stockholders, which says in part:

"We beg to advise you that the directors of the Automatic Electric Company and the Strowger Automatic Telephone Exchange have finally reached a basis of settlement. The plan proposed comprehends the consolidation of the two companies, the transfer and surrender to such consolidated company of the capital stock of the Strowger company upon the stockholders of the Strowger company receiving stock of such consolidated company, in the proportion of one share of stock of such consolidated company of the par value of $100 for twenty shares of stock of the Strowger company, and the purchase by such consolidated company from the stockholders desiring the same of such stock so as to be issued by the consolidated company to the present stockholders of the Strowger company for bonds to be issued by the consolidated company in the ratio of $400 of bonds for one of such shares of such consolidated company stock; the bonds to be twenty-year gold bonds and to be secured by a trust deed to the First Trust and Savings Bank of Chicago, Ill., conveying all of the patent rights, in the United States, present and future, of both companies, and to be further secured by a contract with said First Trust and Savings Bank, whereby the net amount of all sales of foreign patents will be paid to said trustee, for the benefit of the bond holders.

"To cover the instances where stockholders own less than five shares, or after dividing their stock holdings by five, there will be left a balance of shares, we would request you where your ownership or balance amounts to either three or four shares, to remit with your shares $20 for each share less than five, and where your ownership or balance amounts to one or two shares, you will receive therefor cash at the rate of $20 for each share.

"It is with considerable satisfaction that we submit this

proposition to you, having, as it does, the unqualified approval of all of the directors of our company.

"The litigation between the companies has been expensive and necessarily harmful to both, and like all contested cases, the ultimate decision is in doubt; in addition, various conflicting claims are made by both companies, which are certain to result in protracted litigation, during which time all the money due to the Strowger company will be tied up. Taking into consideration the present market value of the stock of the respective companies, we believe that the proposition made is favorable to the stockholders of the Strowger company, and we are of the opinion that this bond issue, bearing an interest rate of 6 per cent, payable semi-annually, will sell for par and better."

A NEW TELEPHONE POLE PULLER.

The Chicago Steel Foundry Company, of Chicago, Illinois, which has long been engaged in the manufacture of jacks, has recently perfected and put upon the market a telephone pole puller which, it is claimed, fills all requirements as to simplicity and ease of operation. It is so simple in design that the most unskilled worker can operate it with perfect safety without causing the breakage of some complicated part, thereby necessitating sending it to the factory for repairs.

Telephone pole puller.

The appearance of the apparatus is well shown in the accompanying illustration. The device has a total length of 45 inches and weighs 100 pounds. This machine is solid steel all through and is fitted with cast steel yokes which are adjusted to the pole by means of a chain. It is said that the apparatus can easily be adjusted to a pole in one minute and the largest telegraph or telephone pole may be speedily removed from the ground.

The Chicago Steel Foundry Company believes that this device is intended to save money and is prepared to make special discounts on quantity orders. An illustrated booklet, fully describing the characteristics of this unique machine and other numerous specialties, will be gladly sent upon request.

ORANGEBURG FIBRE CONDUIT.

SINCE the manufacture of Orangeburg Fibre Conduit began in 1893, the market for this product has grown steadily and rapidly. The character of its material—then a complete novelty—and the great success which has been attained by the conduit in practical employment, render it one of the most interesting departures which, in recent years, have been connected with underground construction.

The material of which Orangeburg Fibre Conduit is made is wet wood pulp, which is itself, of course, a mass of coherent and interlaced cellulose fibres. This material was chosen by the incorporators of the Fibre Conduit Company after years of experiment and study of the needs of the service as that most nearly ideal. Since its inception, Orangeburg Fibre Conduit has been endorsed for practical use by telephone, electric light, and power companies and by telephone and electric light engineers throughout the United States, Canada and England. The conduit is now in use in every state in the union and in every prosperous European country.

The principle embodied in the manufacture of Orangeburg Fibre Conduit which has lead, in a few years, to such remarkable results, is, in itself, of great simplicity. In making the conduit, wet wood pulp in an excessively thin film, is wrapped under pressure upon a forming mandrel, the individual fibres becoming inseparably united into a solid and practically homogeneous wall. Taken off the mandrel, the wet pulp structure is subjected to an air drying process, after which it is placed in a vat of insulating and preservative liquid which thoroughly permeates the entire structure. After treatment the walls of the conduit, upon cutting, present a strong resemblance to hard rubber.

Orangeburg Fibre Conduit is manufactured in socket joint, sleeve joint and screw thread types. The last two kinds are employed when it is inadvisable or unnecessary to use concrete. In the socket joint type, which is the most frequently used, the socket or slip connections are cut on the ends of each length of conduit and are automatically turned. The socket connections are 3/8-inch long, slightly tapering and uniform in size. During the process of cutting, the inside of the joint is reamed so that there can be no off-set at the joints when laid. Owing to the automatic formation of the joints, the connections made in laying the conduit, are perfect in fit and alignment. Bends are manufactured of all necessary sizes and radii to meet turns and curves.

The great advantages as a tube, offered by Orangeburg Fibre Conduit, are most obvious in connection with the junction of the conduit units. The male and female joints are so accurately cut that it is merely necessary to push one within the other to secure absolute and permanent alignment, and, without the use of coupling compound, to form a water-tight and gas-proof connection. No mandrel is needed to secure alignment as with clay conduit, nor is it necessary to wrap each joint with burlap to keep the concrete from seeping through the joints to the interior of the duct.

Because Orangeburg Fibre Conduit is manufactured from thin wood films, the interior of the duct is finished as a perfectly smooth wall, without burrs or blisters of any description, thus giving an absolutely smooth surface for the drawing-in of cables. It is a recognized fact that about ninety per cent of all underground cable trouble is directly traceable to some injury to the lead-casing of the cable inflicted when the cable is being drawn into the duct, or else, to lack of that protection which should be afforded to the cable after being placed in the conduit. The injuries to the cable while being drawn in are usually caused by burrs or blisters on the interior of the conduit, or to nipples of concrete that have seeped through the joints and formed and hardened on the bottom of the duct. In drawing the cable over these defects the sheath may become seriously abraded or cut. Injury to the cable also results very often from loose and leaking joints, which allow stray currents access to the interior of the duct.

Orangeburg Fibre Conduit prevents injury of any description to the cable sheath.

But, besides the extreme value Orangeburg Fibre Conduit possesses from a mechanical standpoint, there are advantages in its use of premier economical importance. These advantages flow logically from the extreme lightness of the ducts, a direct consequence of the material of which the conduit consists. As is well known, the method used in making joints in conduit work, very largely increases or decreases the cost of installation. But, aside from its qualifications already adverted to for resisting wear and tear, Orangeburg Fibre Conduit possesses a vast initial advantage in that it may be installed in half the time needed for

the installation of any other type of conduit. Its ducts are so light that they are usually made in lengths of five feet. A workman can readily carry thirty feet of 3-inch socket joint Orangeburg Fibre Conduit from curb to trench. A like number of feet of clay conduit would weigh over 200 pounds and would be utterly impracticable to handle in this fashion. One 5-foot length of 3-inch socket joint type weighs six pounds, while its equivalent in vitrified clay conduit, consisting of three and one-third lengths of 18 inches each, would weigh 45 pounds. One man, helping the ductlayer, can with ease keep the layer constantly supplied with Orangeburg Fibre Conduit material, while, if clay conduit were being installed, it would require two or three helpers to carry the same number of feet of conduit from the curb to the layer in the same space of time.

Owing to the lightness and long lengths of the Orangeburg Fibre Conduit with the resulting advantages just detailed, common labor, at the maximum rate of $2.00 a day, can install this conduit as rapidly and as accurately as the highest paid laborers obtainable.

Another important consideration is that the cost of transportation and cartage of the conduit is reduced to practically one-seventh of that of other types of conduit. The cost of Orangeburg Fibre Conduit installed, is less, length for length, than that of any other conduit on the market. Orangeburg Fibre Conduit shows no deterioration from the action of gas; is waterproof and not attacked by acids or alkalies; is unaffected by moist earth and lasts indefinitely under ground. It is an excellent non-conductor and practically does away with the trouble due to stray electrical currents.

R. E. WILLARD'S NEW POSITION.

R. E. WILLARD, who is well known to the trade through many years' contact with the different phases of Independent telephone development, has accepted a position as general superintendent in the manufacturing plant of the Central Telephone & Electric Company of St. Louis, Missouri. This will be good news to his many friends and to the customers of the above company. Mr. Willard has had a thorough preliminary engineering education, and a practical working experience as an exchange constructor and manager, and subsequently occupied a position as designing engineer and superintendent of a leading telephone manufacturing plant.

R. E. Willard.

The Central Telephone & Electric Company and Mr. Willard are to be congratulated on this move, which is only another evidence of the fact that they are building up a strong manufacturing as well as sales organization. The value of the many improvements the company is incorporating in the 1908 line will appeal to the buyers, and undoubtedly assist the company in having a most prosperous year.

THE "BSCO" CELL.

THE points to be considered in selecting a battery for telephone work are: What are its mechanical characteristics? How much work will it do? How much does it cost per unit of work, and does it work uniformly, or does it run down and deteriorate with age? No matter what the service, these questions are pertinent, and there is quite a difference between the several types of batteries, both as to cost per unit of current output and as to reliability and maintenance costs. An electrical battery is simply a means of supplying a suitable amount of electric current at a suitable voltage. Assuming that all the batteries under consideration will do this, the remaining question is that of cost and reliability.

The caustic soda or copper-oxide class or batteries, of which the "BSCO" is the latest and most improved type, is largely used for telephone work, since, as Professor Carhart says, "The copper-oxide battery has a capacity for work per unit weight greater than any other, either primary or secondary." The new "BSCO" cell for instance, occupies a space 9½ inches high by 7½ inches in diameter, and will deliver 350 ampere hours.

A battery should not only contain a great amount of energy, but it also should be able to deliver the energy into the external circuit instead of using it up within itself in overcoming internal resistance. This holds true whether the cell is to be used for operating a pole changer, lighting switchboards, signal lamps, acting as a common or central energy battery or to supply current to the operator's talking circuit. Low internal resistance is particularly important in the last case, for, as Abbott states, "transmission depends in a large measure upon the energy changes in the circuit, due to the varying transmitter resistance. So, in designing the transmitter circuit, the resistance of the source of the common supply is as important a consideration as its electro-motive force." The internal resistance of the new "BSCO" cell is about .02 ohm. It will therefore be seen that if the transmitter resistance is three or four ohms, the internal resistance of a set of "BSCO" cells is negligible in comparison.

This is important in another way, if the cell is used to supply several transmitters, since, if the battery has a considerable resistance, the pulsations of current over one transmitter will produce pulsations of electro-motive force at the battery terminals, consequently a slight pulsating current in the other circuits, causing "cross-talk."

Not only do "BSCO" cells contain a great deal of energy per unit weight, but this energy is obtainable at a comparatively low cost. The elements of the cell consist of plates of zinc and copper oxide immersed in a solution of caustic soda and so arranged that they are easily removed and replaced by new elements when exhausted. The list price of a complete set of renewals for a 350-ampere hour cell is only $1.60—that is, less than one-half cent per ampere hour. The labor and attention required for renewal are inconsiderable, since the large capacity of the cell enables it to remain in service for a long period, greatly reducing

the number of times that it must be looked after in a given period.

Another peculiarity about the "BSCO" type of cell is that it is perfectly non-polarizing—that is, it keeps up its full electro-motive force, no matter how large the current drawn from it, until the elements are entirely consumed, differing in this respect very markedly from other types of batteries which quickly tire out and run down in voltage, but recover again somewhat after standing idle.

This feature is especially valuable where the cell is used for operating signal lamps and pole changers and manufacturers of the latter device have found that the "BSCO" type of cell is the only kind that can be used economically and satisfactorily for operating the vibrator, since the latter is running all the time the year round, whether the ringing current is closed or not. Equipped with a "BSCO" battery, the pole changer becomes absolutely dependable, and can be run day after day, week in and week out, without attention and without failure, doing away with all complications and the uncertainty of ringing generators driven by water motors, gas engines, hot air engines, electric motors, etc., as well as with the laborious and slow hand ringing. The vibrator arm of the pole changer will be kept in motion for over six months or a year by a single "BSCO" cell.

The "BSCO" battery is manufactured by the Battery Supply Company, of Newark, New Jersey, and is an improved form of the Gladstone-Lalande battery, with which telephone men are generally familiar, and from which the "BSCO" cell differs in having the zinc and copper oxide plates and the hanger all attached in one piece, so that they can be shipped from the factory "in the altogether," ready for insertion in the cell after being attached to the cover by screwing up one wing nut. In a future issue further details regarding the advantageous mechanical and electrical features of this cell will be presented.

FRANK H. STEWART EXTENSION.

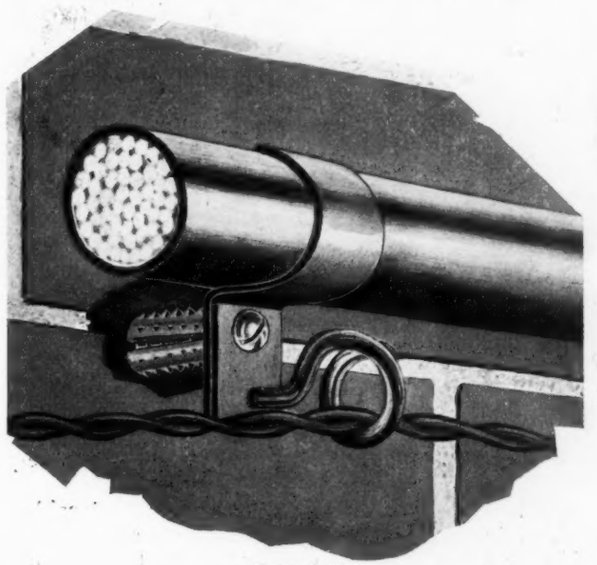
THE Frank H. Stewart Electric Company, of Philadelphia, has grown so rapidly that it has decided to build an extension to its present establishment at Seventh and Filbert streets, in that city. To make room for the company's new building the old United States mint—where the first United States money was coined in 1792—will be torn down. Mr. Stewart bought the old building last April from

Where once there was "a mint of money."

the J. Lewis Kates estate, paying $45,000. In 1835 the building was sold to Michael Kates for $8,100. It was in that year that coinage in the structure was discontinued, after a long period of activity beginning in 1792. George Washington laid the corner stone in July, 1792, and the building was the third erected by the United States government. During the forty years that it was occupied it was the sole place in the country where currency was coined. George Washington, who laid the corner-stone, which is to be presented by Mr. Stewart, the owner, head of the Frank H. Stewart Electric Company, to the Historical Society, is said to have contributed some of his own silver for the initial coinage. The silver and gold vaults of the subterranean section are sturdy, apparently, as when built. The accompanying illustration shows the arches of the foundations laid 115 years ago, which are almost as solid to-day as in 1792.

SOME MODERN CONSTRUCTION SPECIALTIES.

THE Diamond Expansion Bolt Company, of 9-15 Murray street, New York, claims an improved method of attaching lead cables and bridle wires to buildings and fences



Patented.

Long Saut Cable Clamp and Diamond Expansion Screw Anchor.

in interior block distribution, which is aptly described by said concern in the following article:

"The increased use of the telephone in business districts and closely populated apartment house sections of the larger cities has made it necessary to abandon the long and costly parallel runs of bridle wires, and in many localities this form of construction has been replaced by lead cable. Where formerly the lead cable was run from the street subway to a pole, and aerial wires distributed from the pole to the various buildings within a given radius, the cable is now run in a small duct from the manhole, through the cellar of a building to the rear court, usually to the corner of a block. A diminishing cable is then run through the center of the block along fences, walls of buildings, etc., with terminal boxes conveniently located. This cable usually contains from fifty to one hundred percent more conductors than are required at the time of installation. By this method the number of telephones in use can be supplied and a surplus of conductors for future business obtained at less cost than the former method of running additional bridle wires whenever a new telephone is installed. This, however, does not entirely eliminate the use of bridle wires, it being often necessary to parallel a run of cable with one or more bridle wires for a short distance in order to connect the telephone to the nearest terminal box.

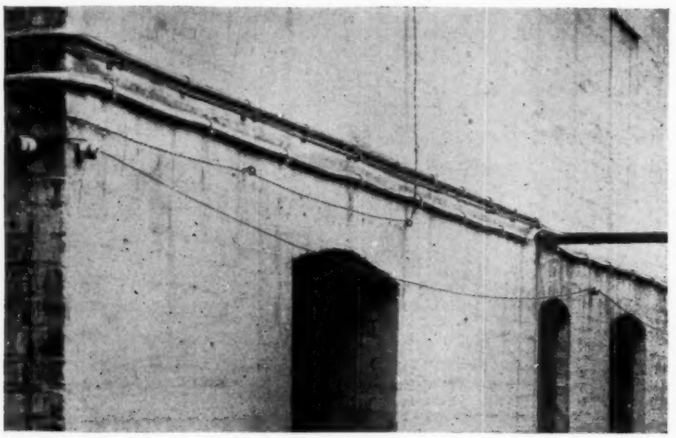
"The Diamond Expansion Bolt Company has devised and marketed an attachment, which with one fastening will support the lead cable and bridle wires paralleling the cable. This is done by means of a clamp, which it calls the "Long-Saut" cable clamp; very similar to half a pipe

strap bent back on itself and made of soft steel with round edges. It also is provided with two holes, one for a wood screw or expansion bolt used interchangeably when fastened either to brick or wood. The other hole is tapped for 10-24 machine thread in which a brass bridle ring can be screwed, either at the time the cable is put up or at any later date when bridle wires are to be run parallel to the cable. The advantages of this attachment are numerous, one of the chief improvements being that after the clamps have once been put up no further drilling or hammering on the wall is necessary for stringing bridle rings, as was the case with the old "spike dog." The malleable iron spike dog was formerly driven into a wood plug requiring a very much larger hole than that for the composition one-part Diamond expansion shield or screw anchor.

Lead cable and parallel bridle wires attached with "Long Saut" cable clamp, showing terminal box.

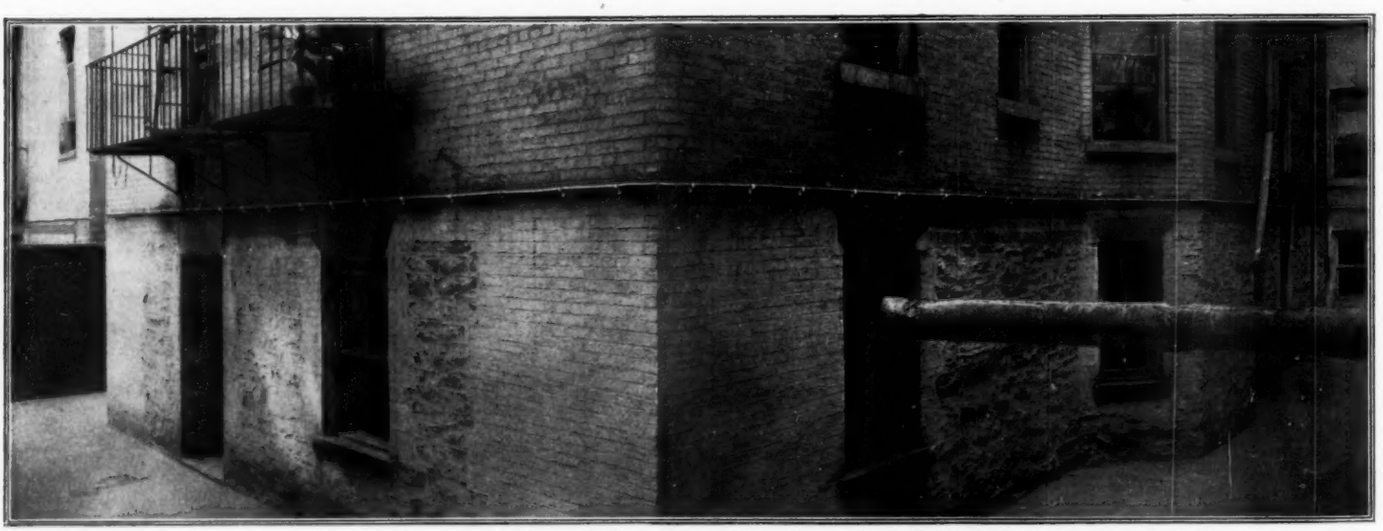
"When hammering in a spike dog over a lead cable, the cable sheathing was invariably damaged to such an extent that, if ever taken down, it was impossible to again use it. Furthermore, the spike dog was usually driven into a pine plug, which in a period of one or two years so dried or rotted out that the cable could be pulled off the wall by hand without any difficulty. With the use of the spike dog it was necessary to get permission from the owner to drill holes in the wall and place the cable, and later, when the wiremen came to put up the bridle wires, it was necessary to do additional drilling for the bridle rings. This often caused trouble and complaints which are now avoided from the fact that when the 'Long-Saut' cable clamp is once attached bridle rings can be screwed into them by the workmen without disturbing occupants of buildings and in much less time. For this reason, the clamp has become known among some of the telephone linemen as the 'Noiseless' clamp.

"The photographs shown on this page will give a fair idea of the class of work now being done in New York city and vicinity, and will illustrate the neat appearance of same. This form of construction is still in its infancy, but it is believed that the rapid growth of the telephone industry will make it necessary before long for the adoption of this interior block form of construction. The telephone company which is building a new plant in the reconstructed portion of San Francisco is using this clamp on all of its new work, and when completed it will have a most approved and up-to-date plant."



The upper cable and parallel bridle wires are attached with "Long Saut" cable clamp and Diamond Expansion screw anchors. The lower cable is attached in the old way. Note the difference.

The new "DX" bridle ring, which is also illustrated herewith is another appliance recently patented by the Diamond Expansion Bolt Company, which claims many advantages for it over the old style, "pig tail" ring. Among these claims are: The ease with which it is attached by means of a galvanized wood screw, increased strength, the fact that the bridle wires need not be bent or twisted in order to insert in the ring, and also that, after being once placed in the ring, they cannot jump out. This ring is now ready for delivery in galvanized iron and can be furnished in enamel when desired. It is plain, however, that the use of enamel rings for insulating purposes is entirely unnecessary as the wires come in contact with buildings, etc., between



Lead cable attached to wall by means of "Long Saut" cable clamp and Diamond Expansion screw anchors.

the rings, and, being amply insulated themselves, the increased cost of furnishing rings with enamel seems to be useless. The demand for galvanized iron is accordingly becoming constantly more general.

HARVARD SELF-WELDING WIRE JOINTS.

THE Harvard Electric Company, Chicago and New York, has perfected a "wire joint" for splicing both iron and copper wires which is mechanically and electrically perfect. The company claims that it has demonstrated this fact to the satisfaction of some of the largest users in the country as well as many noted electrical engineers.

The construction of the sleeve or joint is, in itself, a simple device to look at, but its success is due to its beveled edge and care in manufacture.

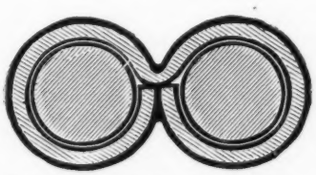
Harvard joint after twisting.

The little diagram below almost tells the story. A sample, which will be sent free for the asking, will tell the rest. Ask for one, twist it up yourself, cut it in two and see an absolutely perfect joint.

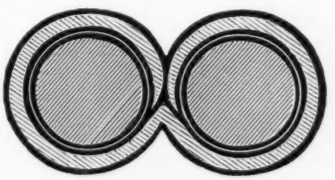
Harvard self-winding wire joints.

In the Harvard joint the mere act of twisting forces the beveled edges of the sleeve into the recesses between the wires and the joint, gripping it absolutely tight around both wires, making a perfect weld. A joint made with the Harvard self-welding wire joint is stronger than the wire itself, the makers assert.

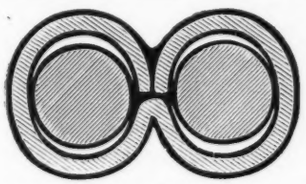
When a twisted joint is cut in two it is almost impossible to tell where the metal in the joint stops and the wire begins. Moisture or air cannot penetrate and corrode the wire and the joint, therefore you are always sure of a good connection with the Harvard self-welding wire joint. The Harvard company points out that it is only necessary to use the ordinary splicing tools.



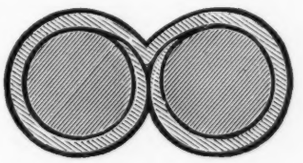
Other joints before twisting.



Harvard joints before twisting.



Other joints after twisting.



Harvard joints after twisting.

On account of its peculiar construction the Harvard joint may be used as a combination joint with success, which feature is of considerable value, as it means less variety of sizes in stock for the consumer. The strength of the Harvard joint has been thoroughly demonstrated and the joint is positively stronger than the wire. It will stand several twists in addition to the three and one-half twists, used in common practice, without fracturing, and in fact it can almost be tied into a knot, it is claimed.

The Harvard Electric Company will be glad to forward samples gratis to anyone interested and a card addressed to either the Chicago office or New York City office will bring further information relative to the Harvard self-welding wire joint, which, by the way, is made for all sizes of both copper and iron wire.

SIEMON HARD RUBBER CORPORATION.

THE Siemon Hard Rubber Corporation, of Bridgeport, Conn., claims the distinction of being the largest manufacturer of electrical insulating materials on this side of the Atlantic. It is widely known throughout the telephone and general electrical field and supplies many of the largest manufacturers in the United States and abroad. Its products for the telephone trade embraces chiefly receiver shells, transmitter mouthpieces, handles, knobs, etc. In addition to this, the concern also manufactures special insulating material for telephone purposes termed the "Imperial." This material, it is claimed, is not affected by moisture, does not change color and is of exceptional strength besides possessing high heat-resistance and exceptional electrical insulating properties.

The Siemon Hard Rubber Corporation is said to control the supply of most of the essential raw materials entering into the manufacture of its line of goods and is prepared to give exceptional guarantees as to quality and workmanship. It is furthermore equipped with the most modern facilities, having a plant of large capacity and a thoroughly organized corps of experts familiar with all branches of manufacture in the insulating field. The firm claims that its prices and goods cannot be duplicated and respectfully solicits further investigation at the hands of those who may be in the market for this class of goods.

The Siemon Hard Rubber Corporation was organized in January, 1903, and has enjoyed a steady and healthful growth, increasing each year and being even to-day, in spite of the wide-spread trade stagnation, prosperous financially and with its factory running overtime. Furthermore, plans have been made for a new factory to be built in the spring for the purpose of taking on a new line of work.

The officers of the Siemon Hard Rubber Corporation are Carl F. Siemon, president and treasurer; Herbert L. Smith, vice president and superintendent; John Taylor, secretary.

READING STANDARD MOTOR CYCLE COMPANY.

ECONOMY of time and maintenance of good service are items of such vital importance to telephone companies that the motorcycle has come to be more and more each year an essential part of their equipment. It is said that statistics, covering the cost of maintaining horse and carriage for the use of "trouble-chasers," disclose that said cost is practically double that of maintaining and operating a first-class motorcycle, to say nothing of the difference in original cost, which is largely in favor of the motorcycle, and without referring also to the matter of time which is probably the most important item of all when it comes to removing trouble.

The Reading Standard Motorcycle Company, of Reading,

Pa., has made a special study of the requirements of the telephone field and has succeeded in perfecting a type of machine which is sold at a reasonable price and under the fullest possible guarantee.

In addition to this, the Reading motorcycle is so equipped that a "trouble-chaser" can take along with him a full complement of supplies and tools with which to make repairs.

Quoting from a letter which the Reading Standard Motorcycle Company recently received from Lester Williams, of North Anson, Maine, we read that the motorcycle which he bought of this company is the strongest running one he ever rode on.

"There seems to be no limit to the power," he said. "It will take hills, and the steeper the hill the better the motor seems to like it. Wednesday, the 14th, I rode 22 miles over a hilly road in just an hour, and crossed a country ferry-boat and stopped twice for teams and once to oil up, out of that time."

The Reading Standard Motorcycle Company is prepared to make prompt deliveries and invites correspondence from telephone companies which may be interested in supplies of this character.

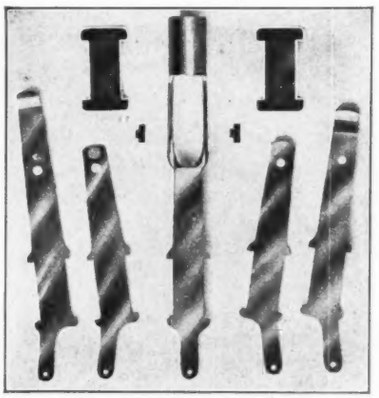
JOSEPH STOKES RUBBER COMPANY.

THE Joseph Stokes Rubber Company, Trenton, N. J., carries a complete line of hard rubber goods, catering principally to the manufacturers of all classes of telephone appliances. One of the company's specialties is the manufacture of hard rubber battery jars which are designed especially for all kinds of sparking batteries. This line in itself is an extensive one. The company has been making hard rubber goods about seven years, and employs approximately two hundred people, owning enough space adjoining the plant to build a factory three times larger than the one which is now in operation. The equipment is new and up to date in every detail, which is a guaranty of the highest class of material. The company is at present—and has been for a number of years—furnishing the largest manufacturers with hard rubber goods. Any information will be given upon request.

STROMBERG-CARLSON SPRING JACK.

The principle of designing unit parts of spring jacks, mounted in banks of five or twenty, so that the combined assembly of the strip of jacks will result in an even distribution of the greatest strength at all points in the entire length of strip is particularly noticeable in the design illustrated with this article. The force applied at all points on the strip by the constant inserting and withdrawing of plugs is the cause of the rapid depreciation of spring jacks that are weak in mechanical construction, and is the source of the greatest trouble common to every type of switchboard. The mechanical features that are characteristic of this new design eliminate all possibilities of trouble in the jack unit, and combine many economical ideas in the design of parts that will be appreciated by the manufacturer from that viewpoint.

By referring to the illustration of the entire strip it will be seen that the end lugs, formed of sheet brass, support the clamping and retaining strips at the back as well as provide a means for fastening the jack strip in the section. These lugs are fastened and formed in such a manner that they have no chance to become loose. The form of the contact springs and insulations of each jack make every unit self-supporting and dependable upon each other, which combines

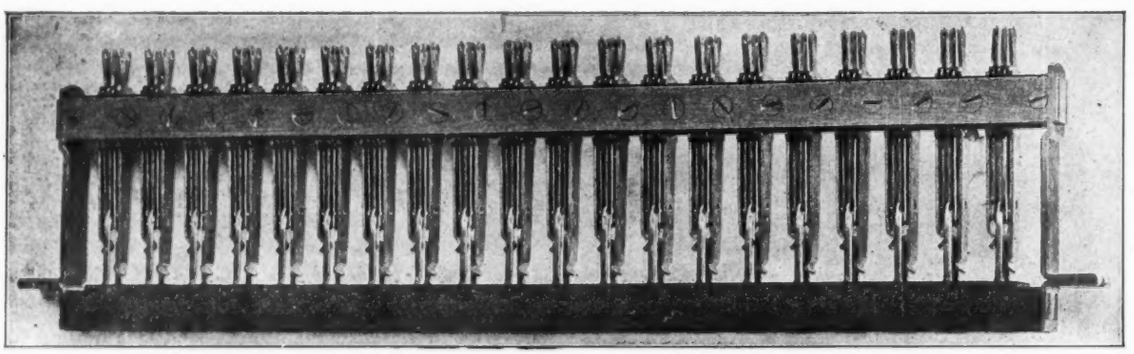


New type spring jack dissesembled.

strength and uniformity and does away with extra parts not useful in the assembly.

A common fault with spring jacks of this type is due to a degree to the form of the contact springs. It will be noticed that the maximum width of the springs in this design is retained throughout and the small ears or lobes are added at the point where the spring is held, rather than taking away a portion of the metal so that the spring will fit over a mounting strip. This form accomplishes the result of preventing the spring to move back or forward and at the same time maintains the greatest strength the size warrants at this point, rather than to weaken it. It will be seen also that the thimble or main spring is a direct support through the center of each unit.

The Stromberg-Carlson Telephone Manufacturing Company is furnishing this style of jack with six-panel multiple and various non-multiple switchboards. The various circuits and types of boards that these classifications cover require several combinations of contacts, all of which are



Strip of new type spring jacks.

regularly furnished on the 10½-inch strip in 5 per, 10 per, or 20 per strip. A little detail, but an important one, is shown in the construction at the point of contact, whereby "floating contacts" are eliminated by the use of rubber pins between the springs.

Code numbers covering the different combination of jacks for plugs of .250-inch diameter are as follows: No. 109, two-point; No. 110, two-point, having one break con-

tact on tip spring; No. 111, two-point, having one local make contact between tip and sleeve spring; No. 112, two-point, having one local break contact between tip and sleeve spring; No. 113, two-point, having local break and make contact actuated by tip spring; No. 114, two-point, having break contact on tip and sleeve springs (double cut-off type); No. 115, two-point, having break contact on tip and sleeve springs and a local make contact actuated by tip spring; No. 116, two-point, having break contact on tip and sleeve springs and a local break contact actuated by tip spring.

A NEW "CLEAR-OUT" DEVICE.

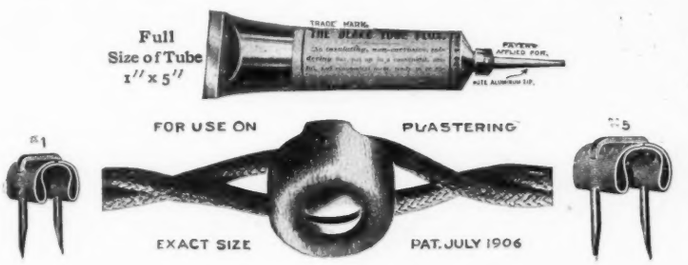
IF you are operating a magnetic exchange and your subscribers complain that they "can't ring off," you can rid yourself of this annoyance by attaching the little device, which the accompanying cut illustrates, to the series telephones you already have in use. It is inexpensive and is just being put on the market by the Western Telephone Manufacturing Company, of No. 50 West Jackson boulevard, Chicago, Ill., the "Pioneer Independent Telephone Manufacturing Company." This attachment is designed to

fill a demand which for years has been made on telephone manufacturers by operating companies using series instruments, and to afford some relief from the subscriber who is always meeting them with: "What's the matter? I get tied up. I can't ring off."

The fact that a large number of orders are already being received indicates to its manufacturer that this "sure ring-off" is filling a long-felt want.

BLAKE TELEPHONE SPECIALTIES.

THE Blake Signal & Manufacturing Company, 246 Summer street, Boston, Mass., is meeting with success generally throughout the telephone field in connection with its three specialties—Blake insulated staples, Blake tube flux for soldering and Blake compressed cleats for use in attaching interior telephone wires. These three specialties appeal with special emphasis to those who believe in correct con-



struction and who not only enjoy neat and correct work, but appreciate conveniences afforded them to that end.

Illustrations of the three Blake specialties for telephone use are presented herewith. Doubtless they are fairly familiar to the majority of telephone readers but many who will be considering supplies for the coming season, will find it to their advantage to investigate the many advantages claimed for these three articles. Full particulars and prices can be had by addressing the Blake Signal Company at Boston.

HABIRSHAW WIRE COMPANY.

THE Habirshaw Wire Company is the new name adopted by one of the largest and best known wire manufacturing concerns in the United States, formerly known as the India Rubber & Gutta Percha Insulating Company. The change of name, which was adopted for the sake of brevity and convenience, went into effect January 1, and entails no changes as to management, officers or heads of department. The company will continue to manufacture high-grade articles, known throughout the trade as red core, white core, telephone and telegraph wires and all kinds of "code" and special wires, as well as signal, submarine, mine, torpedo and underground cables. For over twenty years, this company has been manufacturing the well known Habirshaw wire, cable and core. The business will remain under the supervision of Dr. W. M. Habirshaw.

SOUVENIR POST CARD.

THE following illustration has been made from a souvenir post card which is being mailed extensively to the telephone trade by G. W. Johnston, president of the West-

Western Electrical Company, Omaha.

ern Electrical Supply Company of Omaha, Nebraska. The card is in colors and makes a very attractive advertisement for this well known Omaha supply house.

COOK POLE CABLE TERMINAL.

FRANK B. COOK of 242 West Lake street, Chicago, Illinois, calls attention to his type M-4 pole cable terminal which appears in our advertising columns this month.

This terminal is an all-porcelain terminal of new and unique design and is built on lines which are entirely different from anything of its kind yet produced, and Mr. Cook claims that it has everything in the unprotected terminal line "beat to a standstill."

Being all porcelain, the insulation of this terminal is said to be beyond question, and also indestructible by fire and proof against moisture.

While Mr. Cook's advertisement describes this type in a comprehensive manner, still it is rather difficult to appreciate how a pole cable terminal of such marked efficiency

and ease of access can be so small in size. When it was first introduced, Mr. Cook exhibited it to a prominent telephone man, who promptly commented very favorably upon the sample and asked when he could see this new porcelain terminal full size. Considering this fact, we publish below a comparative table which gives the dimensions of the various sizes in which this "Little Giant" is made.

Size.	Height.	Diameter.
5 pair	6 in.	4½ in.
11 pair	6 in.	4½ in.
16 pair	7¼ in.	4½ in.
21 pair	5¾ in.	6¼ in.
26 pair	6½ in.	6¼ in.
36 pair	7½ in.	6¼ in.
52 pair	10 in.	6¼ in.

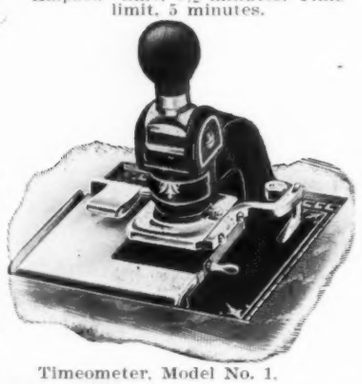
It is Cook quality in every sense of the word and very moderate in price. Mr. Cook will be glad to demonstrate its superiority to any interested party.

THE "TIMEOMETER" FOR TELEPHONE USE.

THE Automatic Time Stamp Company, of 160 Congress street, Boston, Massachusetts, announces that it has perfected a device for recording the time consumed by telephone toll messages. Among the advantages claimed for this device, which is styled the "Timeometer," we quote the following from a very interesting booklet which the company has prepared for issuance to the telephone trade:

Timeometer, Model No. 3.

Double imprint. Hour and Minute. Elapsed time, 5½ minutes. Time limit, 5 minutes.



Timeometer, Model No. 1.

"The Timeometer is very strongly constructed of the best materials upon approved mechanical principles, consequently it is very durable and not liable to get out of order.

"The clock is guaranteed to keep excellent time, is protected by a dust-proof case, and is wound and regulated in exactly the same way as an ordinary clock. The time printing and computing parts are made of hard brass and the time graduations are accurate to a fraction of a second, and the setting of the clock also sets the printing hands.

"The ticket gauging or positioning device enables the toll ticket to be quickly and accurately put in the proper imprinting position. The inking ribbon is always under complete control and a new one may be readily inserted without interfering with the operating parts of the machine.

"The printing parts may be cleaned without disturbing the adjustments.

"The Timeometer has the least possible number of parts and occupies the minimum amount of space upon the switchboard. There are no complicated movements of operating handles, the Timeometer having but one handle, which is always moved in the same direction.

"The Timeometer record gives not only the time of 'beginning' and the 'elapsed time' but also the 'finishing' time, in connection with but a single dial imprint.

"The reading of the elapsed time is always done on a single dial, the readings of the two dials never having to be added together; consequently the Timeometer records can never be misread, nor the elapsed time appearing on one dial omitted to the loss of the telephone company.

Double imprint. Hour, Minute and Second. Elapsed time, 1 min. 22 seconds. Time limit, 1 minute.

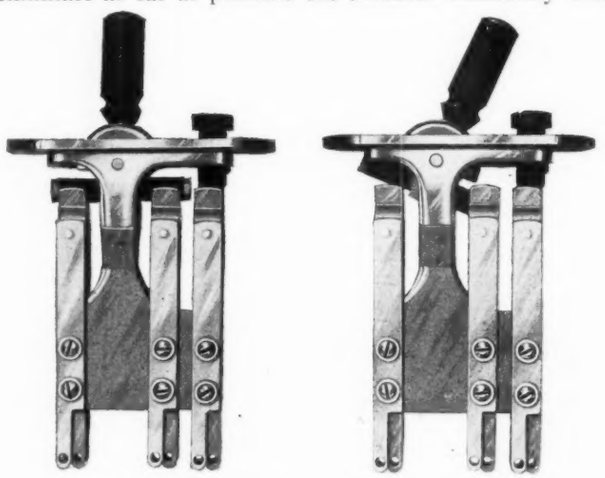
Double imprint. Minute, Hour and Second. Elapsed time, 1 min. 37 seconds. Time limit, 3 minutes.

"The 'time limit' feature of the Timeometer record saves an immense amount of time, as with it a close inspection and an actual reading of the 'elapsed time' is only required when the initial time limit is exceeded.

"The Timeometer makes no errors in computing and recording the 'elapsed time' when the toll tickets are not placed in the right position, that cannot be detected and checked, for the reason that in the Timeometer the dials and hands are not printed at different times, but both dials and hands and the computing scale are always printed simultaneously."

RINGING AND LISTENING KEY.

THE Western Telephone Manufacturing Company of 50 west Jackson boulevard, Chicago, Illinois, is manufacturing a ringing and listening key that has been designed to eliminate as far as possible the troubles commonly found in ringing and listening keys. The frame is a casting which makes the key strong and rigid. The springs are manufactured from the best German silver and so clamped that the springs are not weakened and liable to break where they are clamped. The only part of the key subject to wear is



New Western Ringing and Listening Key.

the rubber bushing on the rocker arm that operates the springs and if these after some years of use become too small they can be replaced in five minutes at the cost of a few cents. A ringing and listening key that insures a good contact, that is not liable to have broken springs, that needs little attention and is easily repaired has been demanded by the telephone managers and this key is the result of that demand. The company would be pleased to quote prices upon request.

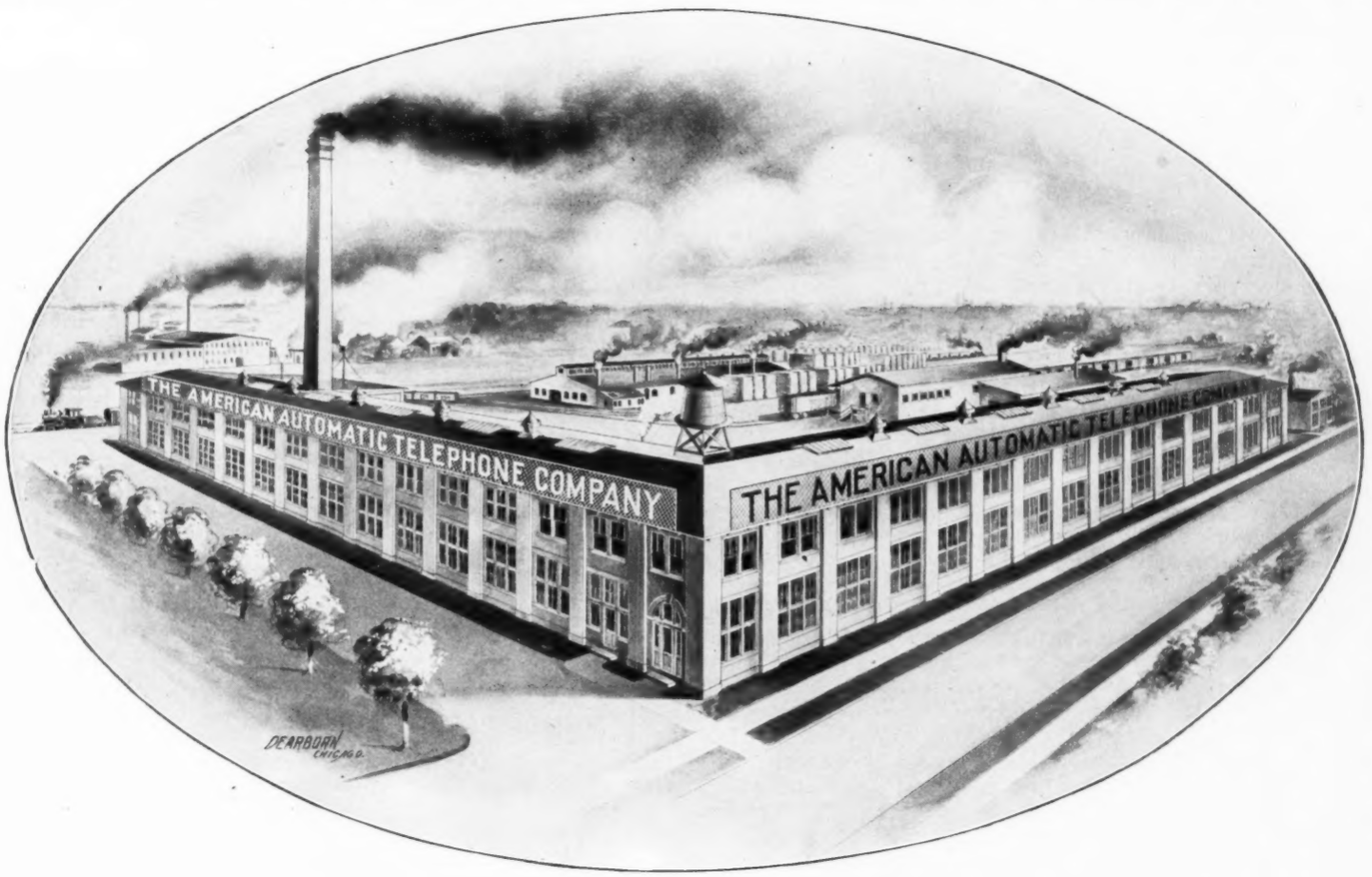
THE AMERICAN AUTOMATIC TELEPHONE COMPANY.

ONE of the important new manufacturing concerns of the telephone field, and one which bids fair to become an important factor in competition for telephone trade, is the American Automatic Telephone Company, of Urbana, O. This new organization comprises the American Automatic Telephone Company, of Rochester, N. Y., and the Select Telephone Manufacturing Company, of Springfield, O. Both of these concerns had already established enviable reputations and were producing excellent lines of apparatus. Their consolidation not only produces an unusually strong combination from a manufacturing standpoint, but the reorganization also brings with it new financial interests which will give the concern ample backing, as well as a new factory affording ample facilities and a thoroughly modern equipment.

Furthermore, the new factory is so situated as to enjoy the very best of shipping facilities, being located on three of the largest trunk line railroads of the country—the Pennsylvania, the Erie and the Big Four. Its site covers fourteen acres of land.

The new officers of the American Automatic Telephone Company are James S. Brailey, Jr., Cleveland, O., president; J. W. Lattig, Rochester, N. Y., vice president and manager; W. M. Bruce, Jr., secretary; C. D. Juvenal, treasurer. The board of directors consists of Messrs. Brailey and Juvenal, together with C. H. Marvin, George Hite and F. E. Dye of Urbana, and several Rochester gentlemen who were formerly associated with Messrs. Lattig and Goodrum in the American Automatic Telephone Company. The standing which these men enjoy in the telephone field is sufficient assurance that the new concern will enjoy the confidence of the trade from its very start.

In fact, it is said that it will commence business in its new factory with bonafide orders for over a quarter of a million dollars' worth of new apparatus already on hand. The company will exhibit at the Chicago convention this month a complete line of apparatus, including among other new features its harmonic ringer which has proven a wonderful success and its new desk telephone which is on a par with the rest of its apparatus, as well as equally interesting types of central energy wall telephones.



THE MILONITE PERFECTION NAIL.

AN article which has been adopted by a large number of the leading telephone companies for installing double insulated interior telephone wire is the "Milonite Perfection Nail." This nail is a combination of a sharp, central-pointed wire nail which drives easily into hard wood, with a head made of fibrous insulating composition, the whole being covered with an insulating coat which can be made to match either the wire used or the wood on which the wire is to be installed.

These nails are said to have many advantages. They are small, light and easily handled, and wire which has been installed with this nail can be taken down without injuring the insulation. They also are neat in appearance, and are said to be perfectly effective.

Telephone companies which are not using the "Milonite Perfection Nails" at present should investigate them. They can be purchased from all the leading electrical supply houses or direct from the Morley Manufacturing Company, No. 118 Boylston street, Boston, Mass.

TRADE NOTES.

THE CRACRAFT-LEICH ELECTRIC COMPANY has issued a line of circulars descriptive of its generator call telephones and switchboards, which the company will be pleased to send to all interested parties upon request.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, recently secured a contract for a 450 line extension to the 4,800 capacity 750 equipped central energy multiple switchboard installed at Fort William, Ontario, last season. The contract includes central office apparatus and telephones.

THE ELDREDGE MANUFACTURING COMPANY, of Springfield, Mass., has recently published an interesting booklet, entitled "Battery Testing Instruments." The folder illustrates and thoroughly describes a number of the company's most popular apparatus. It will be gladly sent upon request to those mentioning TELEPHONY.

THE STANDARD UNDERGROUND CABLE COMPANY, of Pittsburg, Pa., heralds its well-known "Tip Top" rubber wire with a series of illustrated cards recently issued. The Singer building, New York City, 672 feet high, is the latest of a long list of the highest class buildings in the country to be equipped throughout with this brand of wire.

THE NATIONAL BATTERY COMPANY begs to announce that owing to its daily increasing business it has taken possession of the entire building at No. 236 West 54th street, New York, N. Y., one door west of Broadway, which contains many times more floor space than the present office and depot, where the company will be fully equipped to handle everything pertaining to battery requirements.

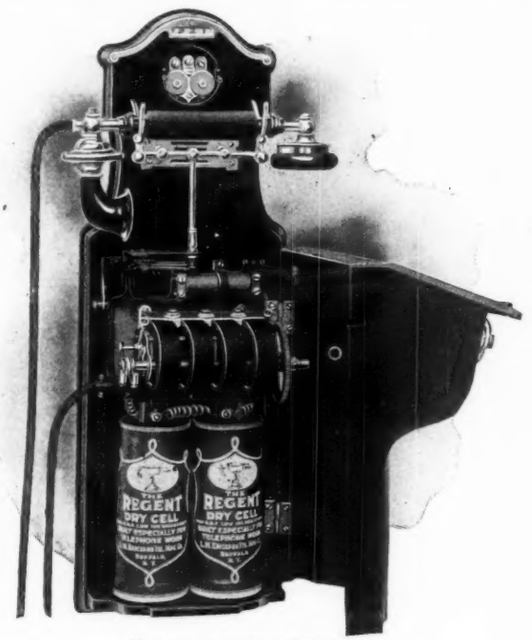
MAJOR B. HAWXHURST, who has for the past three years been with the Dean Electric Company as southern representative, is now representing the L. M. Ericsson Telephone Manufacturing Company, of Buffalo, New York. Major Hawxhurst has a very large circle of friends in the Independent telephone field who will not forget him as a man of rare qualities with whom it has always been a pleasure to deal. His knowledge and experience in all branches of telephone work should insure him meeting with great success in his latest undertaking.

THE MASSACHUSETTS CHEMICAL COMPANY, of Walpole, Mass., manufacturers of insulating materials, etc., reports an unusual increase in the sales of its No. 264 rubber friction tape. It is claimed that this is an exceedingly high grade rubber friction tape possessing all the essential characteristics to meet the requirements of the electrical trade. It has first-class adhesive qualities and does not deteriorate with age. It yards 175 feet to the pound and is ¾ of an inch wide. The friction is smooth without pinholes. The compound does not adhere to the hands under ordinary atmospheric condition and is especially adapted to withstand the varying elements and service to which it is subjected. An illustrated catalogue fully describing the complete line of specialties will be gladly furnished upon request if TELEPHONY is mentioned.

ERICSSON STEEL TELEPHONES.

THE steel telephone illustrated herewith is the only one of its kind manufactured. It was designed to meet the demand that operating companies have made for a better and more substantial telephone, and has met with universal success. Steel telephones in the form of a "hotel or residence type" have been in use for some time past and have proved extremely popular, in some instances so much so as to entirely do away with the old-fashioned wooden types. The above named "hotel or residence type" is not a "standard wall set," in so much as it does not have writing shelf, space provided for dry batteries, or adjustable arm, and for these reasons cannot be classed with the "New Ericsson" all-steel telephone which embraces all these features.

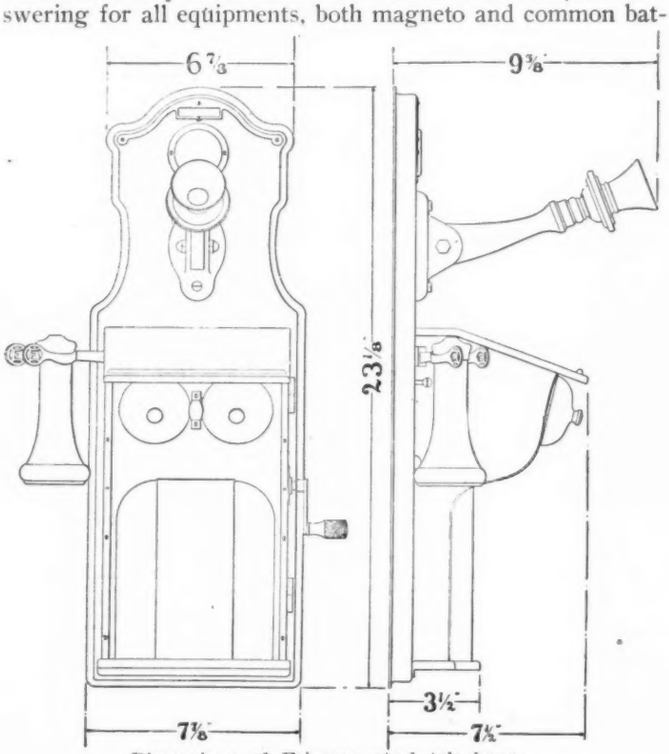
The "New Ericsson" is the first all-steel standard wall type telephone ever placed on the market and its very small



Ericsson steel telephone.

size has been the subject of much favorable comment. The line drawing below gives the compelte dimensions.

There is only one size of cabinet manufactured, this answering for all equipments, both magneto and common bat-



Dimensions of Ericsson steel telephone.

tery systems. Such a feature marks the solution of the "standard equipment" problem. Every telephone on the line looks exactly alike and there is no room for complaint on the part of a subscriber because he has an old instrument while some one else has one of later design.

In order to fully appreciate the beauty of the "New Erics-

son" steel set one must see the instrument itself. However, a fair conception of its beauty may be gained from the half-tone prints in the Ericsson booklet "B" describing these telephones. Among other things in the description of these telephones, the booklet lays particular stress on the manner in which the cabinets are finished. Before enameling, the cabinets are heavily copper-plated, which prevents rusting and insures a very lasting finish. Three coats of enamel are separately baked on, each being applied by "dipping" which forms a finish of uniform thickness inside and out, and entirely free from brush marks.

Among other points that have developed during the time that this telephone has been on the market is the question of the subscriber's safety. The manufacturer states the cabinet does not enter into any part of the electrical circuit. All wires are very heavily insulated and are afforded additional protection by using heavy rubber bushings where they pass through the cabinet.

The handmicro type with cradle switch for common battery systems illustrated above is proving to be a very popular type. From reports received it would seem that this type will soon outdo the older "adjustable arm and receiver" instrument. This may be accounted for in the fact that the Ericsson handmicro is a most decidedly reliable and efficient instrument.

If you have not yet received a copy of the Ericsson booklet "B," write for one to-day.

ST. LOUIS' TELEPHONE ANNIVERSARY.

THURSDAY, November 22, was the thirtieth anniversary of the introduction of the telephone into St. Louis. That the entrance of the invention—now so universally used and depended upon—was attended with great excitement may now be difficult to believe, but the old newspaper files of 1877 bear out that fact.

It was on November 22, 1877, that the first exhibition of the telephone over single wires with a number of receivers in circuit was given in St. Louis. The American District Telegraph Company, in St. Louis, was endeavoring to devise some plan by which the newly invented telephone could be substituted for the small signal boxes in use on their wires. Prior to that time the experiments with the telephone were limited to a private line connected by a single wire.

The first of these private lines for permanent use was installed early in the year 1877 between the office of Semple & Birge Manufacturing Company and a small factory on Main street. Observing the startling effect of music produced by a harmonica, the sounds of which were accidentally transmitted over the wire between these two offices, Mr. Birge called in conference George F. Durant, general manager of the district company, and James Hamblet, territorial agent of the company, which resulted in an arrangement for the first telephone concert ever given—in fact, the first exhibition involving a number of instruments and listeners.

Twenty-six telephones, which had been sent to Chicago, but had not been unboxed, were telegraphed for by Mr. Hamblet and expressed to St. Louis. These, with a like number already in the city, gave fifty-two telephones at command, and which were the greater part of the supply then in existence. One of these instruments was placed in the residence of General W. T. Sherman, where were soloists from the arsenal band. At one of the places of business was Professor Stevens, a distinguished cornetist of that time. Excellent quartets and soloists were at the residence. The programme had been carefully prepared and rehearsed in advance as all were unfamiliar with the telephone. Music was furnished from six different points, all of which was listened to by about one hundred representative ladies and gentlemen, business men and clergymen, who remained during the entire evening, and not one present, except the hosts, had ever before seen a telephone.

At that time the battery transmitter was unknown, and the part of the telephone now used only as a receiver was used both for receiving and transmission. The single iron wire of the early days of the telephone strung from the house tops has now given way to the modern copper metallic circuit and underground cables. The telephone exchange has eliminated private lines. While fifty-two telephones was the total available number to be found in these western cities, much more than that number can now be found in many single establishments.

HOW TO USE THE TELEPHONE.

THERE is a right way to use a telephone and a wrong way, too, and it is surprising how many people adopt the latter. The Colorado Telephone Company recently issued a new edition of its booklet entitled "The A. B. C. of

The Right Way to Use a Telephone.

the Telephone," in which the illustrations shown herewith appear. These illustrations show very plainly the right and wrong way to use the telephone. Needless to say, the young

The Wrong Way to Use a Telephone.

lady is following the right way, speaking directly into the transmitter and having an easy, natural pose at the instrument. On the other hand, look at the "careless man"; If the telephone doesn't give him good service it is manifestly his fault. There is a good lesson in the two contrasted poses.

The Southern Bell Telephone & Telegraph Company has agreed to abandon its policy of giving rebates and free telephones, beginning January 1.

Digest of Telephone Literature
Conducted by E.M.Rothelle

[This digest includes the telephone articles printed in technical and scientific publications in all civilized countries. It is a complete index to the world's telephone literature. All publications are given numbers and are on file in our offices. The title appears first followed by author's name, number and date of publication; for example: 125-12-14-07 is Electrical World issue December 14, 1907. Those desiring publications containing any article in this digest should write TELEPHONY.—Editor.]

A Graphic Method of Finding the Self-Induction of Generator Armatures. Arthur F. Poole. 102—12-15-07. The article is of a mathematical character, containing nine illustrations, showing graphic methods of calculating self-induction. The author criticizes methods followed by two other writers upon the same subject.

Telephone Accounting. George B. Fawkes. 111—12-1-07. This is the third installment of a series of articles by the same author. In the present article estimates, job system and cost rates are discussed. The telephone accounting picture is shown and the tables and forms are of considerable interest.

Selenium Relay. Gösta Allström. 162—12-21-07. In a short note illustrated by three circuit diagrams attention is drawn to recently developed relay which responds to .000000000001 amperes. This is brought about by installing a reflecting galvanometer in the circuit where the small flow of current is present, and permitting the spot from the galvanometer mirror to illuminate a selenium cell connected in series with a secondary relay and suitable source of current.

Independent Toll Lines. E. A. Bruce. 111—12-1-07. Competitive telephone service is discussed, the article being based upon a paper presented before the South Dakota Independent Telephone Association. The author states that the Independent companies have about 4,000,000 telephones in use, compared with 3,000,000 claimed for the Bell companies.

History of the Automatic Telephone. A. B. Smith. 102—12-1-07. The automatic telephone exchange developments have been very remarkable during the past five years and Mr. Smith's article is a continuation of an illustrated analysis of the automatic systems as viewed from a practical standpoint. In the present installment Figures 8 to 15 are presented.

Testing and Locating Trouble. H. E. Custard. 111—12-1-07. In a paper read before the Michigan Managers' Association convention, Mr. Custard draws attention to the importance of taking care of troubles promptly in order to retain the telephone subscriber's good-will.

An Oscillagraph for Testing Purpose. W. W. Crawford. 124—11-1-07. The importance of making studies of electrical currents with the oscillagraph is daily becoming more apparent. Mr. Crawford's article is accompanied by five illustrations, in which the circuit connections are shown, and valuable suggestions also made for producing oscillagraph records.

Rules for Operating Room Employes. K. Weisiger. 121—12-7-07. In the present installment of this series of articles, instructions are given regarding the completion of local connections and suggestions for proper methods of answering calls.

Protection of Telephone Apparatus. P. K. Higgins. 102—12-15-07. This subject is discussed from a theoretical and practical standpoint. Four diagrams are given showing the proper positions for fuse links and high potential current arresters.

Specifications for the Construction of Underground Conduit. S. D. Levings. 102—12-15-07. This is the first installment of what promises to be a series of articles on test holes, excavation of trench, laying of conduit, single conduit and multiple conduit.

Traffic Retrospect. A. H. Dyer. 141—11-1-07. Various curves and tables are given, showing the value of making careful study of telephone traffic. The curves present show a speed of answering tests and are very fully explained.

Selective Party Lines. E. Rendell. 141—11-1-07. This article is a descriptive one showing the operation of the improved system of plus and minus, or what we usually term "biased ringer system." A drawing shows the connections of the pulsating current generator and also a diagram of the telephone circuits.

Rules for Operating Room Employes. K. Weisiger. 121—11-23-07. This is the first installment of a series of articles upon the important subject of operating room rules. The answering of connections, general conduct, care of switchboards, etc., are touched upon. Four cuts show the operators in the different positions as explained in the rules.

Simultaneous Telephony and Telegraphy Over One Grounded Wire. N. C. Kissell. 121—11-23-07. The subject of combining telephone and telegraph service upon the same line wires is becoming one of great importance. The present articles discuss the railway composite circuits, and will be followed by other articles upon the same subject.

Things the Trouble Man Can Tell. C. C. Kingsley. 121—11-23-07. A brief discussion of the different duties of the average trouble man. The author suggests that those who are practically engaged in clearing telephone troubles should report their experiences.

The New Central Battery Exchange at Garrard, London, England. P. T. Wood and A. Wright. 141—11-1-07. A well-illustrated article describing a new common battery exchange recently installed; nine interesting illustrations are presented, no circuit drawings, however, are shown. Present capacity of the switchboard multiple is for 9,520 lines; there are 105 A positions and 48 B positions. The storage battery has a discharging rate of 2,125 amperes, and it is stated that the main cross connecting frame contains 60 miles of jumper wire.

A Bridge Cable at Burton-on-Trent. G. E. Greaves. 141—11-1-07. A number of excellent illustrations are given showing the application of telephone cable to the side of a stone bridge, 470 yards in length, and a girder bridge 650 yards in length.

A Complete Set of Instructions and Rules for Operating Room Employes. K. Weisinger. 121—11-30-07. In the present installment of this serial a number of interesting points are discussed, among which may be mentioned conversation with subscribers, secrecy of telephone conversations, fire drills, and operating methods for A board operators.

Simultaneous Telephony and Telegraphy Over One Grounded Wire. N. C. Kissell. 121—11-30-07. In the present installment of this article, two circuit diagrams are shown, one showing a typical railway grounded line circuit, carrying several telephone and telegraph instruments,

showing instruments connected to the ends of the line, and also showing instruments cut in at intermediate points. The second diagram accompanying the article shows the circuits in a diagramatic manner for the purpose of permitting a more clear understanding of the signaling elements of the system.

The Destruction by Fire of the Antwerp Exchange. J. B. Van Brussel. 121—12-14-07. A general description is given of the recent destruction by fire of a main exchange in Antwerp, Belgium. The exchange was of the old series multiple type and containing 4,400 subscribers' lines. A description of the new board which will soon be installed is also presented.

Rules for Operating Room Employes. K. Weisiger. 121—12-14-07. In the present installment, ringing the subscriber, following up connections, and supervision of calls to desk and long-distance boards are gone into. A description of completing a trunk connection is briefly covered, incorporating ring-down trunk calls and answering ring-down trunk calls.

How to Make and Install a Repeating Coil. H. Flint. 121—12-14-07. This is a continuation of the first article and contains four mechanical drawings and one circuit diagram, showing respectively the construction of a repeating coil and the application of it into a cord circuit.

The Telephone in Paris. 161—11-1-07. Viewing telephone service in Paris from an American standpoint reveals an almost inconceivable condition of affairs. It appears that promises have been made from time to time for increasing the efficiency of Parisian telephone service. As a well-known fact, it is stated, that up to the present time it has been impossible to make more than from ten to twelve connections of three minutes' duration each per hour upon long-distance lines, and that the long-distance lines are as a rule burdened the greater portion of the time with service messages. The suggestion is made that all business pertaining to service should be handled by telegraph through utilizing the same line wires for the combined service.

Electrical Inspection from the Telephone Manager's View-Point. C. M. Mauseau. 104—12-14-07. In a paper presented before the Association of Electrical Inspectors, the author discusses the fundamental principles of electrical inspection. He states that now it is almost absolutely necessary to double up telephone and electric light wires on the same pole line, and that it is more practical to double a telephone company's wires with electric light company's circuits than it is to combine the wires of two opposition telephone companies, and suggests that three companies should not be asked to occupy the same pole line.

Common Battery Equipment at Jesmond Exchange, England. W. U. Lonnon. 141—12-1-07. A small exchange is described and accompanied by three illustrative cuts. The exchange room, the main cross connecting board, the intermediate cross connecting board, and the power plant are shown. The board is of the standard common battery type, and contains 700 subscribers' lines.

Common Battery Test Sets. P. T. Wood. 141—12-1-07. Everyone interested in the maintenance of telephone exchanges should secure a copy of this article. The description is accompanied by seven circuit diagrams and one mechanical drawing. It incorporates the circuit connections for portable test boxes, arranged for testing multiple and many office tests, not only for common battery exchanges but also applicable to the local battery exchanges, an artificial line arrangement is described and drawings show the connections.

The Operation of a Common Battery Subscriber's Instrument. M. Blithe. 141—12-1-07. This is written by a maintenance engineer of London, England. The receiving and transmitting of speech from a common battery instrument is clearly discussed. Three circuit diagrams helping to explain the different actions taking place.

Progress of Wireless Telephony. 142—12-6-07. Count Arco recently delivered a lecture in which he stated that the Telefunken Company was producing uninterrupted oscillations by means of an electric arc, the energy used while a conversation progresses being about seven horsepower. Telephonic communication was carried on without difficulty between stations about twenty-two and one-half miles apart. These experiments took place somewhat over a year ago. Recently, however, messages were transmitted over a telephone forty-eight miles, the power being only one-third of that used in the original experiments.

Progress in Wireless Telephony. Dr. Seibl. 164—12-10-07. Dr. Seibl it is reported recently performed some interesting feats in wireless telephony. It is reported that the Poulsen experimenters very recently transmitted telephone messages for a distance of 200 miles without the use of connecting wires.

Experimental Investigation of an Action of a Telephone Relay. 148—11-29-07. This is the first installment upon an interesting article discussing the action of telephone relay armatures and contact making devices. An oscillagraph is connected in series with the contacts of a relay and the effects are observed, showing relations between the current when connected to the relay and the time it takes for the armature to close the contact. It also shows an interesting effect where the armature contact vibrates slightly before it comes together solidly, this investigation being divided into the following elements:

"A"—The time it takes for the current to raise to such an extent that it is able to set the armature in motion.

"B"—The transit time taken by the armature to pass from its normal position to its drawn up position.

"C"—The time taken to establish definite contact between the armature and the contact stop.

Spon & Chamberlain, New York, have issued a new edition of Norman H. Schneider's book entitled "Electrical Instruments and Testing." New chapters are added on testing wires and cables and locating faults in telegraph and telephone systems by Jesse Hargrave, assistant electrical engineer of the Postal Telegraph Cable Company. The fact that two editions of this book have already been sold proves the utility of this work. The publishers, however, determined to make it still more complete and up to date by adding additional chapters especially for telephone and telegraph wire men. The new information was prepared by an authority.

The first chapters of the work describe the various forms of electrical testing and measuring instruments and their construction.

The remainder of the work is devoted to practical measuring and testing, using the different instruments described and including tests for insulation, resistance, current and electro-motive force made with a voltmeter, as well as many telephone and telegraph tests.

In working out the many practical examples simple algebraic formulas only are used and these are fully explained in plain language. Most of the diagrams have been specially drawn for this book. The work is divided into thirteen chapters as follows:

Introduction. Chapters I and II, The Galvanometer. III, Rheostats. IV, The Voltmeter. V, The Wheatstone Bridge. VI, Forms of Portable Sets. VII, Current Flow and Electro-Motive Force. VIII, The Potentiometer. IX, Condensers. X, Cable Testing. XI, Testing with Voltmeter. XII, Testing Telegraph Wires and Cables. XIII, Locating Faults in Telegraph and Telephone Wires and Cables. Tables. Index.

The book contains 250 pages and 133 illustrations and diagrams. In cloth, $1; full limp leather, $2.

In The Rural Line Districts

The Sarona telephone line is going right up.—*Sarona Item in Shell Lake (Wis.) Register.*

The Farmers' Telephone Company is putting up a line southwest from Osawatomie.—*Sleepy Hollow Item, Paola (Kan.) Spirit.*

The Independent telephone line is headed for Coal City. We wish them success.—*Zoar Gleanings Exline (Okla.) Messenger.*

The farmers' 'phone is now ready, and talk about your early risers!—*West Worden Correspondence Stanley (Wis.) Republican.*

Jos. Hennes went to Shakopee Friday and got a load of telephone poles for extensions.—*St. Joe Correspondence Jordan (Minn.) Independent.*

The telephone line is soon to be lengthened at this end and one more 'phone added.—*West Garfield Correspondence Marietta (Minn.) News.*

Westbrook people have purchased their local telephone from the Windom Mutual and will operate it now on their own hook.—*Mountain Lake (Minn.) View.*

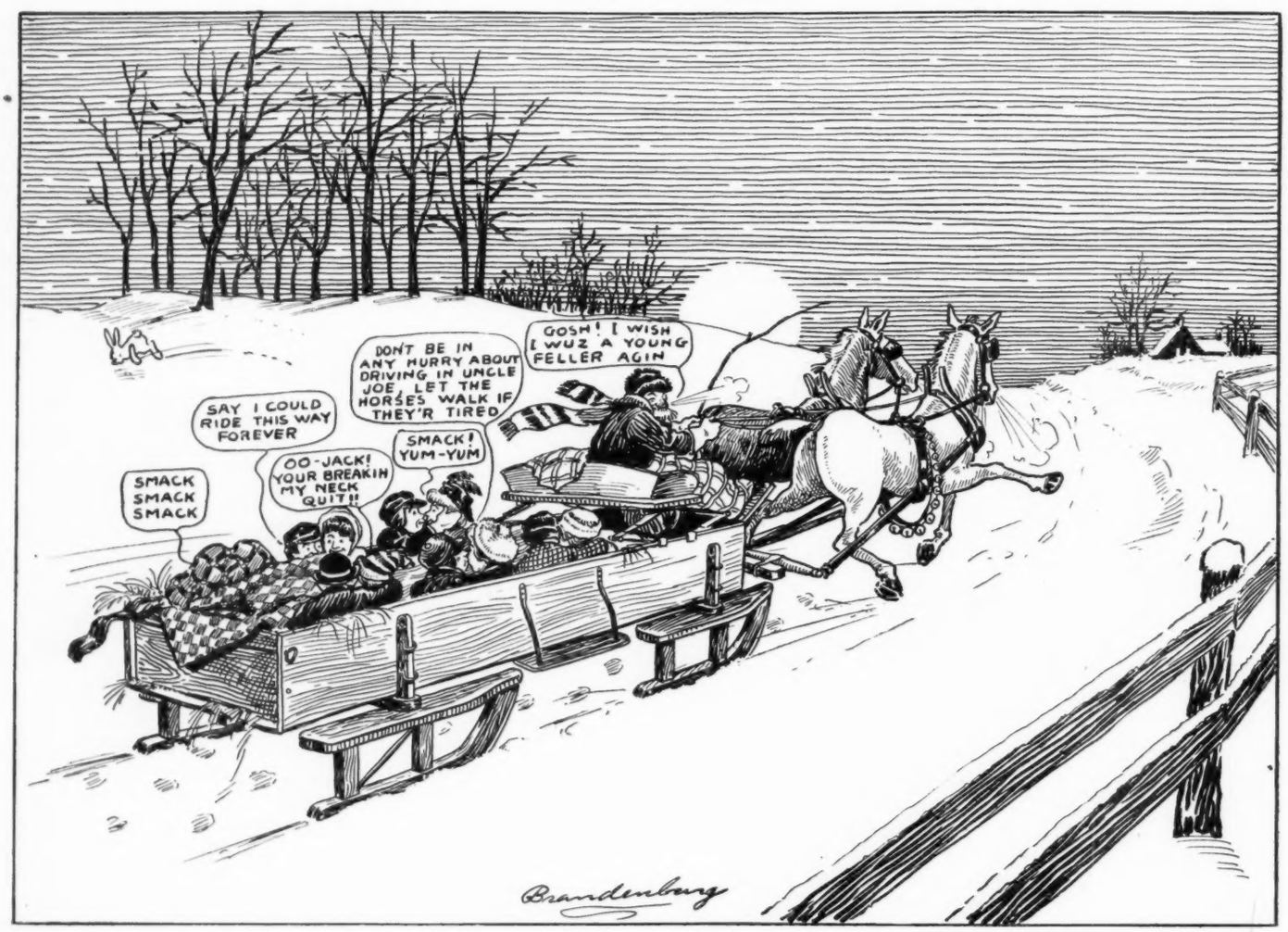
The Viele Independent Telephone Company has built more line, adding to it Mrs. G. W. Ried, F. Burgheffer, Geo. Powers and Wm. Magerkurth.—*Johnstown Correspondence Fort Madison (Ia.) Democrat.*

T. M. Gregg, manager of the Chandler telephone system, was a visitor at the parental home at Girard, Kansas, Sunday and Monday of this week.—*Chandler (Okla.) Publicist.*

The Bippus Telephone Company has lost one of its best employes through the resignation of Edward Haller as lineman. Mr. Haller received $45 and livery expenses per month, but he has decided to take up farming as an occupation more lucrative.—*Huntington (Ind.) Democrat.*

The Cannon Ball Telephone Company are now entering Mott after their long distance line from Richardton. They are stringing wires for an up to date metallic circuit, and many along the line are wondering if they can utilize wire fences to connect.—*Hoosier Correspondence Fargo (N. D.) Forum.*

There is a telephone rate war on at Butterfield and, while some of the residents of that village think they are being robbed by the telephone company, Bro. Eb. Huntington says they are not paying a dodgasted cent too much for the service they receive.—*Sanborn Siftings, Springfield (Minn.) Advance.*


SMACK SMACK SMACK
SAY I COULD RIDE THIS WAY FOREVER
OO-JACK! YOUR BREAKIN MY NECK QUIT!!
DONT BE IN ANY HURRY ABOUT DRIVING IN UNCLE JOE, LET THE HORSES WALK IF THEY'R TIRED
SMACK! YUM-YUM
GOSH! I WISH I WUZ A YOUNG FELLER AGIN
Brandenburg

Last Thursday evening the hospitable home of Uncle Joe and Aunt Sarah Newton was thrown open to the telephone operators from town, who, together with their beaux, spent a most enjoyable evening eating oysters, pulling taffy, etc. One of the best features of the evening was the bob-sled ride going and coming, behind Uncle Joe's spirited team. It was an ideal winter's night and, as one of the boys expressed it, they had the time of their lives.—*Bitter Creek Correspondence in Parsons Co. (W. Va.) Democrat.*